THE GRAY SHEET

Computer Industry

REPORT

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Services Review and Forecast

Computer Industry REPORT

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$150 Billion Worldwide IT Services Market Heats Up; Suppliers Respond to New Competition: Look Out Below!

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Many IT companies have undertaken wide-ranging restructuring to better provide and market IT services — by any measure one of the largest and fastest-growing segments of the industry. Nonetheless, capturing significant new revenue may require more than an overhaul of an integrator's — or a hardware or software supplier's — structure. The migration away from mainframe-centric architectures, the practical complications of heterogeneous environments, and the gravitation toward LAN-based computing are driving demand for new kinds of IT services.

Not surprisingly, these new services require different skills than traditional, systems-oriented services. A host of relatively new services suppliers — small integrators, VARs and network specialists — are well positioned (armed with network-oriented expertise) to address this growing market. As a result, these smaller IT services suppliers, with less than $100 million in revenue, are projected to account for a disproportionate share of the IT services growth through the rest of the decade. Consider the following:

- IT services is an inherently local business because purchase decisions are founded on relationships built at the local level. By definition, smaller integrators are local, vertical, specialized handholders providing a key advantage. Successful national firms like Evernet and US Connect have been built by the acquisition and synthesis of multiple locations dedicated to a specific geographic/vertical market.
- Small suppliers are familiar with existing applications and networks at a location, often because the integrator installed them. Small suppliers can respond and react far more quickly than bigger companies. This is particularly true in the areas of network integration services and contract programming, the two most marketable skills the small VAR/integrator brings to the client/server segment of the market.
- Smaller service suppliers exhibit an eagerness to create, sell, and support highly customized LAN-based solutions. These providers have developed know-how by providing LAN-based and desktop solutions and services, largely ignored by the more data-center-focused large suppliers. To their advantage, these skills are increasingly important elements of IT services growth.

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- Smaller firms are price competitive, offering specialized expertise at reduced cost structures that the larger integrators or consultants cannot match. Smaller companies have developed their businesses by emphasizing industry focus and/or technical expertise.
- Smaller service providers are reliable and loyal, willing to do what is necessary to solve their customers' problems. End users recognize the costs and benefits of enlisting a local firm that understands their business. Local providers can be promptly brought in-house to solve a crisis.

For the rest of the century, network integration services and custom application development will play predominant roles within the IT services spectrum. In five years, it is likely that ISSC, EDS, Andersen Consulting, Computer Sciences Corporation, and other familiar names will still be around, but focusing on business reengineering, outsourcing, and legacy migration. From the ranks of small integrators will emerge some formidable competition for traditional service providers. A firm like BSG Consulting Inc. has, in a rather brief time, grown to be a $15 million firm that is setting its sights on custom client/server application development and integration opportunities in Fortune 1000 companies. New elite players like DMR, US Connect, ACS, and Evernet (acquired in 1993 by Control Data Systems), currently less than $100 million, could grow towards that level by 1997 either as independent players or as subsidiaries of larger firms.

Five-Year Outlook, 1993–1998

The eclipse of traditional maintenance services by integration and consulting in the past few years is startling. In 1987 the IT services market was largely associated with traditional postinstallation service and support. By the late 1980s, technology advancements exceeded the ability of users to plan and implement business solutions. Consequently, the worldwide IT services marketplace is now a more complex, solutions-driven arena. Traditional hardware maintenance services have become commodity markets dominated by big hardware manufacturers and third-party maintenance firms (TPMs). These services have been supplanted by more complex big-ticket segments of the IT services mix including integration, applications development, strategic IT planning, and outsourcing.

- In 1993, the total IT services are estimated to rise to $150.4 billion, with integration and consulting capturing approximately 50% share and growth expected to continue through the rest of the decade. Traditional services now constitute a decreasingly significant portion of the IT services pie.
- By 1998, worldwide IT services spending will climb at a 9.4% CAGR to $213 billion.
- Worldwide systems integration contracts are projected to account for $23 billion in 1993, growing to $47 billion in 1998 at a CAGR of 15%. Systems integration comprises projects, both large and small, designed to deliver information technology for a prescribed business objective.
- Worldwide IT consulting, estimated at $20 billion in 1993, will enjoy a 16% CAGR through 1998, reaching $37 billion as business restructuring accelerates.
- Contract programming, from large reengineering projects to smaller custom development, will account for $35 billion in 1993 and is projected to account for $46 billion in 1998, a CAGR of 7.8%.
- The need to cut information processing costs has led to the contracting of data center operations departments and to business processes fueling growth in facilities management/outsourcing. The facilities management/outsourcing market is expected to grow to $12 billion in 1993, with an 11.5% CAGR boosting it to $21 billion by 1998.

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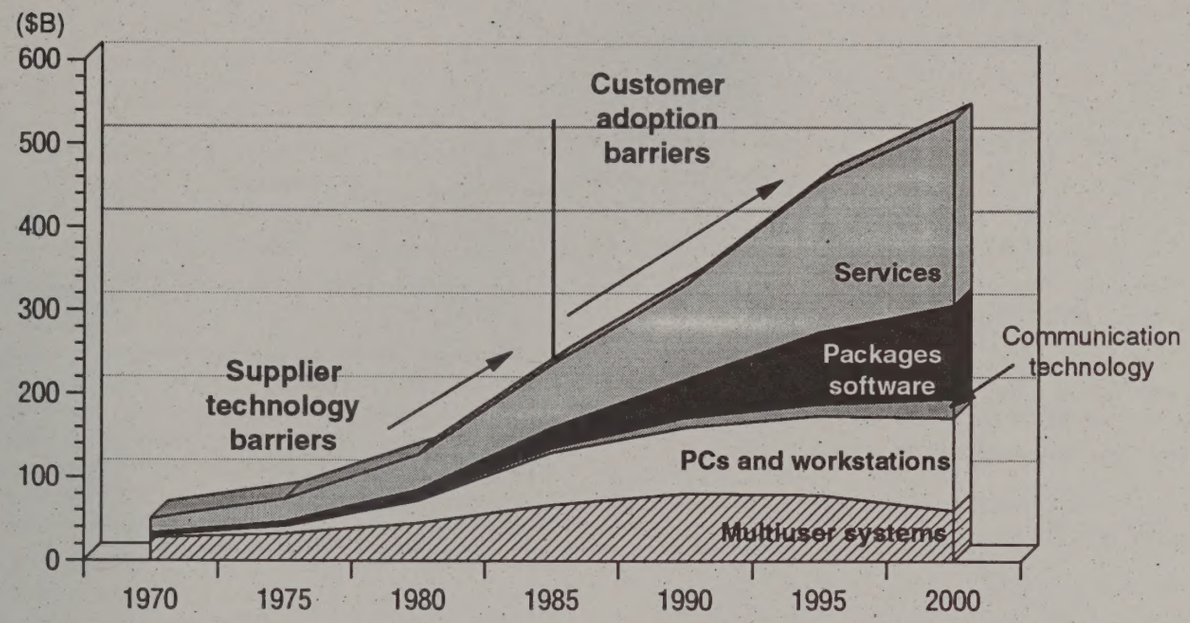
Worldwide IT Market Growth 1970–2000 ($B)



Prior to 1987, the worldwide IT market was dominated by technology providers, and IT services were characterized by traditional maintenance services. Since 1987, revenue growth from value-added services supporting the adoption of new technologies has outpaced those of the technologies themselves.

Source: International Data Corporation, 1993

United States: the Services Leader

U.S. corporations provide the testing ground for cutting-edge services; consequently, the United States remains the largest market for IT services. U.S. corporations are at the forefront of outsourcing the management of data center operations to improve the productivity of information processing. Furthermore, the purchase of consulting has become a more acceptable way to gain outside assistance for improving business processes. In 1993 the U.S. IT services market stood at $58 billion, or 39% of the worldwide market. The bulk of worldwide revenues in emerging and soaring IT services segments — integration services, IT consulting, outsourcing — are achieved in the U.S. market. It is not surprising that U.S. companies dominate the worldwide market for such services.

European IT services, expected to grow to $52 billion in 1993, or 35% of the world market, are dominated by custom application development. Small developers dominate the contract programming segment, which will account for 49% of the European IT services revenues. Japan's market is difficult to measure in that the large conglomerates provide IT services to sister companies, and these services are not reported as third-party revenues. Like Europe, most IT spending is for application development. The nation's pragmatic approach to implementing new technology has held back growth in consulting and training. Nineteen ninety-three IT services spending in Japan is expected to reach $28 billion, or 19% of the worldwide total. IT services expenditures for the rest of the world (ROW) will reach $10 billion, or 7% of the world market.

IT Services Company Profiles

The following profiles review and analyze the major services suppliers in three categories: hardware manufacturers, professional integrators, and management consulting firms. Each category has a unique perspective on IT services and a distinct history of providing those services. The distinctions among these providers are blurring as each finds itself encroaching on unfamiliar turf while exploring opportunities in the emerging and burgeoning IT services segments of business reengineering, integration and consulting, client/server systems, and outsourcing.

Note: Throughout this issue revenues cited refer to IT services only and include a wide range of services such as integration, outsourcing, hardware and software maintenance, education, and training. Nineteen ninety-three numbers are estimates.

Hardware Manufacturers

Specialists prevail in IT services. Consequently, customers logically look to IBM, Digital, or Hewlett-Packard to provide services for their installations. These firms build relationships with customers and over time broaden services as the need arises. To compete in broad professional services, they must overcome the customer perception that they have a bias toward their own hardware and software products. Hardware and software firms are spinning off IT businesses to make them more objective, multidimensional, and less tied to core products. In the view of the manufacturers, most of which have developed multivendor support programs and moved toward support of open computing platforms, that bias is a part of history. The question remains: how can they dispel this reputation in the user community?

The lack of a consistent answer among the hardware manufacturer community feeds customer wariness. IBM's creation of ISSC represents a complete structural separation, probably the most feasible solution. Still, IBM/ISSC remains an IT services partner largely for IBM shops. HP is making no bones about the sale of services to sell hardware and software, even through a separate business unit. Digital's position is less clear. The company insists that it is not in the integration services business to sell Digital products, yet it is quick to boast of its leadership in providing networked-based computing solutions for heterogeneous environments. Because of such bias, expansion into multidimensional IT services for these companies will be gradual. However, bias may be an oversimplification. As much as anything else, it is the weight of their core competencies that will hold them back. Moreover, any business relationship is a two-way street, and product bias is also a by-product of customer expectation.

IBM/ISSC

1992 Services Revenue: $16.3 billion

1993 Services Revenue: $17.5 billion

Key vertical markets: IBM's target verticals for IT services include manufacturing, financial services, insurance, health care, and the public sector.

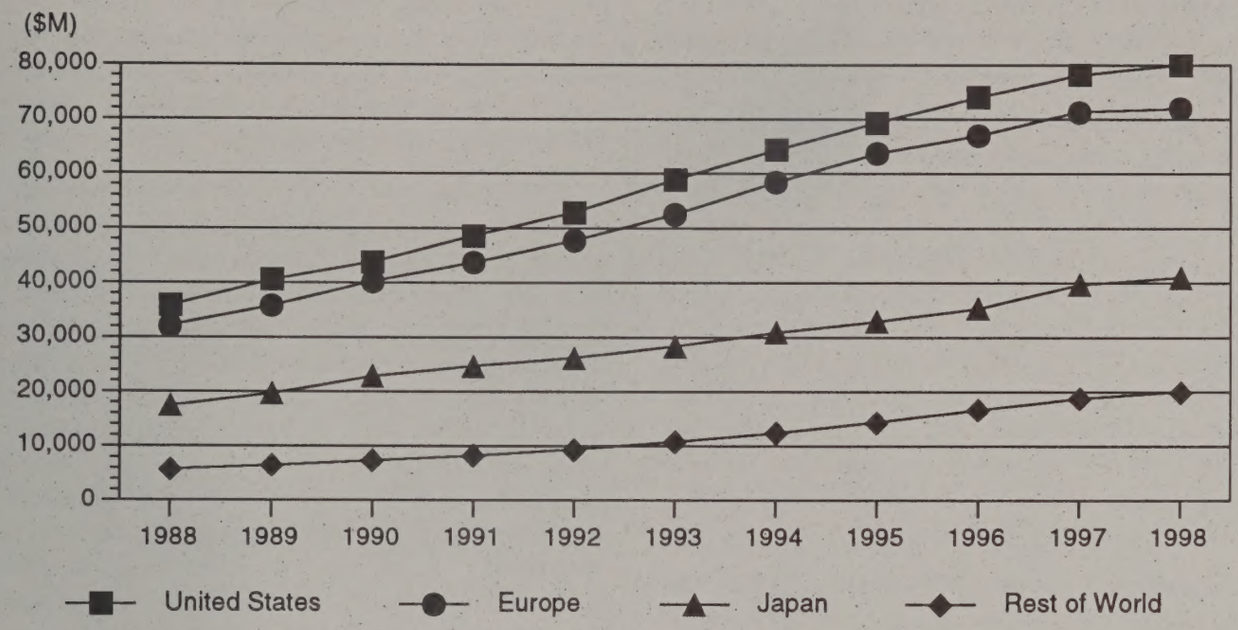
Other strengths: Breadth of products and services, experience in performing integration and consulting services.

Outlook: ISSC is moving toward performing more outsourcing contracts as corporations scale back expenses and seek to concentrate on what they do best. Field service centers may enable IBM to gain a foothold in smaller businesses and develop some of the expertise common among smaller integrators.

IBM has four separate organizations pursuing IT services: ISSC, IBM Consulting, Federal Sector Division, and US Trading Areas. ISSC, a wholly-owned subsidiary, is the most autonomous arm of IBM's IT services business. ISSC's business is a mix of large integration and outsourcing projects with IBM mainframe-based projects. Advantis, a joint venture with Sears Business Centers, is ISSC's network outsourcing arm. The IBM Consulting Group targets the strategic planning and process reengineering consulting segment offering management, functional, and technology consulting in IBM and non-IBM environments. Adorned with its own logo, the group is bent on distancing itself from the parent organization. The Federal Sector Division bids on government integration contracts, largely with an IBM focus. The Federal Sector, although profitable, is reportedly up for sale. The Trading Areas, or branch offices, concentrate on IBM-based technology solutions for specific industries.

IBM recently reorganized ISSC to minimize overlap and competition and to better define the roles of ISSC and the IBM Consulting Group. ISSC is to compete for large integration projects and outsourcing contracts. The IBM Consulting Group now focuses exclusively on business and systems consulting. Both groups are organized by vertical market. When appropriate, the groups pursue projects jointly, with the Consulting Group providing analysis and recommendations, and ISSC handling IT implementation. The Trading Areas compete against smaller integrators in the small- to medium- sized business market. In 1993, IBM established 31 field service centers to focus on small integration deals with a geographic and vertical focus. They also provide integrated services such as service operations and maintenance.

Worldwide IT Services Expenditures by Region, 1988–1998 ($M)



U.S. and European corporations continue to drive worldwide IT services expenditures. In an effort to boost information processing productivity, U.S. corporations first led the move to outsourcing of data center management and are now turning to integrators and consultancies to improve business processes. European corporations rely heavily on outside firms for custom applications.

Source: International Data Corporation, 1993

ISSC still bids on IBM-based solutions and obviously has an inside track on projects that include IBM mainframes. It is able to leverage IBM's reputation in broad-based commercial markets that have used IBM systems and software for many years. ISSC will lead IBM's charge into outsourcing, squaring off against EDS. In 1993, it has enjoyed strong growth and should capture significant market share. The further ISSC can separate itself from its parent, the stronger its competitive position will be. However, it will never be able to completely separate itself from IBM. It should continue to leverage IBM's long-standing relationship with ISVs to develop joint solutions for particular industries and align itself with best-of-breed providers through subcontracting alliances, partnerships, or investment.

IBM, which has been in the professional services industry longer than any other manufacturer and most independents, still commands a leading position in terms of dollars and scope. Nonetheless, more than any other vendor IBM is stuck with the vendor-bias label. The growing independence of ISSC and the forward thinking of the Advantis venture are promising. But the company must continue to develop partnerships, be they as joint ventures, as with Advantis, or close ties with others, as with ViaSoft, for application reengineering.

Hewlett-Packard

1992 Services Revenue: $2.9 billion

1993 Services Revenue: $3.3 billion

Key vertical markets: Worldwide focus is on manufacturing, telecommunications, and financial services. Other verticals are determined by geography and business concentration.

Other strengths: Unix leadership in systems, resource management, and network management software.

Outlook: HP will focus on downsizing opportunities in which it can leverage its own products as a mainframe alternative.

Hewlett-Packard's Professional Services Division (PSD) was formed in August 1991 to deliver HP-based solutions. The PSD reports to the commercial systems group. Services cover consulting, education, systems integration, and project management. HP Professional Services emphasizes client/server architecture, downsizing, and open systems planning and implementation. HP is unabashedly committed to maintaining the traditional role for integration services: to sell HP products. With the acceptance of its Unix systems and

related software and its aggressive activity within standards organizations, HP is throwing its resources at the opportunities in the downsizing movement. The Maintenance Alternative Program was established to aid corporations transitioning to open HP systems.

As a prime contractor for integration projects, HP partners with established integrators such as Computer Sciences Corporation, giving HP legitimacy in large commercial and government accounts that its own professional services organization lacks. Also, these companies provide the data center experience HP lacks. HP has developed the Open Software Environment (OSE) Workshop to aid clients in assessing needs and identifying business processes that can be downsized, integrated, or otherwise automated. Mainframe alternative processing has been successfully implemented at GTE, Swedish Telecom, TNT worldwide enterprises, and Texaco.

Product bias is not an issue for HP. The HP 9000 midrange system, OpenView systems management application, and its resource management applications are central components to its solutions. A customer not interested in an HP solution goes elsewhere. HP's product development focuses on open computing and interoperability. HP's efforts within standards bodies for performance management, systems management, and Unix interfaces should not be overlooked. If HP technology becomes central to standards, it can only bolster its reputation as an open-computing solution provider.

Digital

1992 Services Revenue: $6.2 billion

1993 Services Revenue: $6.4 billion

Key vertical markets: The company's professional services business includes systems integration, business consulting, and training in Digital's traditional areas of expertise — manufacturing and scientific/engineering. Emerging markets include health care, financial services, and telecommunications.

Other strengths: The distributed nature of its technology and the preponderance of Digital equipment in heterogeneous environments invite integration services.

Outlook: Remains questionable whether Digital can move quickly into non-Digital segments. Development of outsourcing business and joint projects will be keys to expanding the scope of its IT services.

The direction of Digital's IT services business is less clear than either IBM's or HP's, stuck between the company's need to offer the multivendor services users require and its own needs to expand its systems and software business. Services have long been used to leverage systems and software sales, and old habits are difficult to break. The company states on the one hand that it is not in professional services to sell Digital boxes, but at the same time its systems are touted by the company as the best solution for downsizing and distributed networks. Given the distributed nature of its installations and their multivendor character, this boast is not empty.

Digital has been in the outsourcing business for about four years. In September the company announced that its consulting organization will be managing its own data centers as a rehearsal for entry into the arena. Turning over internal operations provides legitimacy and economies of scale for bidding on new projects. Digital's strength is its multivendor support business, which is further along in terms of expertise and customer acceptance than that of any other hardware manufacturer. While all hardware firms talk about offering these services, Digital is best at it. Digital's competitors in this business are TPMs like Bell Atlantic Business Systems and Intelogic Trace, firms traditionally dedicated to multivendor services.

For the past several years, Digital has relied more and more on software and services for a percentage of its business, and they now exceed 50% of revenues. Digital contends that it is a resource for multivendor computing, but its long suit remains solutions based, at least in part, on networked VAX systems. Users will consider Digital for solutions that include Digital products. In those organizations, of which there are many, the vendor can aggressively present itself as a resource.

Professional Integrators

The household names of the integration business — CSC, EDS, Andersen Consulting, and the rest of accounting's big six — have in the past been accused of being too dependent on traditional mainframe-centric IT services solutions. This criticism has dissipated in recent years because that emphasis has gradually given way to diversification into client/server computing, CASE tool development, and the leveraging of corporate contacts to develop the outsourcing and strategic IT planning services that smaller firms can only dream of selling. The diversified portfolio of services provided by the professional integrators is a great asset. Maintaining that diversity within an unbiased framework is a key to continued success. To better compete for LAN-based services, these players must partner with or acquire those that can. The CDS acquisition of Evernet may be a harbinger.

Small* U.S.-Based Service Providers by Vendor Category, 1993

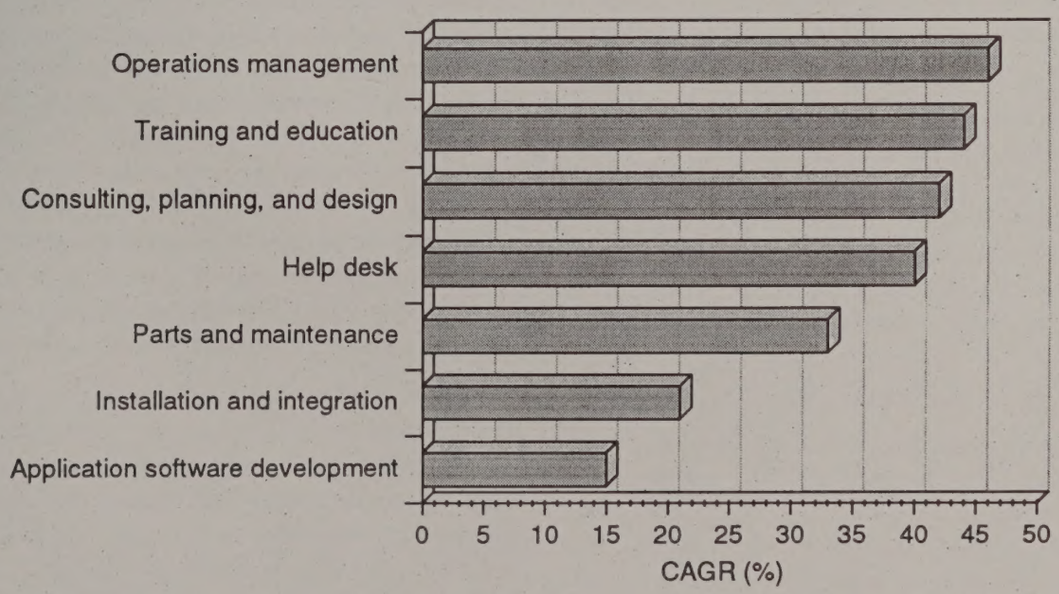
Service Provider Category	Number of Companies	% of Total
Independent service organizations	240	3
Value-added resellers	3,712	46
Systems integrators	3,420	43
Network integrator	640	8
Total	8,012	100

Customers turn to small integrators for focused vertical solutions often featuring network integration and application development. Among the mix of small U.S. service providers, firms providing comprehensive business solutions (integrators and VARs) comprise the two largest categories within this segment.

* Under $100 million in annual revenue

Source: International Data Corporation, 1993

U.S. Small-Provider Growth Rates by Service Segment, 1992–1994



Small U.S. integrators are opting to enter the outsourcing business. Adding this dimension to their portfolios creates a more diversified services firm and augments their business-solution experience within specific industries.

Source: International Data Corporation, 1993

Evolution continues in outsourcing as companies move beyond traditional facilities management and farm out the automation of processes and even departments. EDS has been in this business for years. CSC has established a dedicated commercial outsourcing unit to pursue this opportunity. Among the traditional IT services players, these companies are driving the restructuring of information system management and emerging business process reengineering. Andersen Consulting and the accounting firms are not major outsourcing players and may never be such. Their diversification leans toward the strategic-planning, management-consulting segment. An emerging market for these players is benchmarking services in which they can leverage their hardware independence. Andersen and the rest of the big six accounting firms can leverage high-level contacts with major U.S. corporations, giving them an inside track in strategic IT planning. Outsourcing can be pursued in partnership with specialists like ISSC, CSC, and EDS.

At the corporate level, large integrators enjoy some of the same advantages as small ones: long-term relationships, solid reputations, and a willingness to do whatever is needed. Professional integrators are well positioned to exploit the new opportunities in IT services. Their collective strength, when measured against the hardware manufacturers, is relative objectivity. Consequently, professional integrators are measured by a different metric because they have no specific hardware to sell — their core competency is services, not manufacturing. Among their challenges are these:

- Organization — by region, technology or vertical market. Most service industries (law, finance, accounting) shape their organizations according to their customers' needs — a vertical orientation. But in IT services, that may mean higher costs from lack of scale economies. While vertical market focus is important, the services provided must have a horizontal quality transferable to a number of businesses.
- Investments — to be a low-cost provider implies enjoying scale economies. But in the computer industry, price/performance curves are so steep that yesterday's low-cost solution won't be tomorrow's. Services suppliers have to keep investing in people and skills, be it through training existing personnel or recruitment of expertise from competitors.
- Technology — leveraging existing code or skills and applying repeatable solutions across industries is the best way to lower costs. However, in a market built on custom solutions, leverage does not come easily. The development of critical technologies, like Andersen's Foundation CASE products, enables integrators to offer identifiable solutions to generalized problems with a strong custom component (e.g., client/server application development).

Andersen Consulting

1992 Services Revenue: $2.7 billion

1993 Services Revenue: $3.1 billion

Key vertical markets: Broadbased market expertise including banking and financial services, manufacturing, government, telecommunications, and wholesale/retail. Andersen Consulting develops products in an array of technology segments including networking, client/server, GUIs, multimedia, and artificial intelligence.

Other strengths: The firm's strength remains its ability to build custom software and networking solutions.

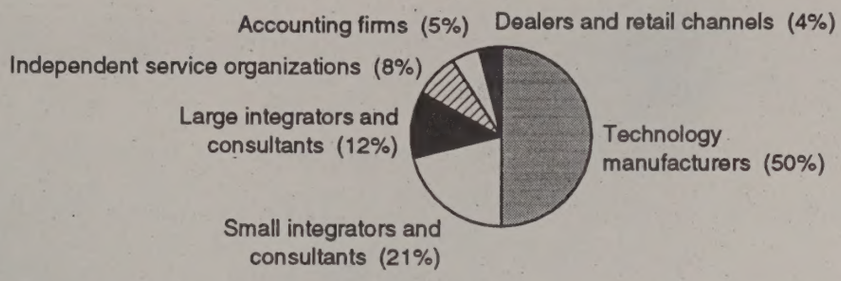
Outlook: Andersen will focus on client/server integration solutions as its key growth segment while riding out its mainframe consulting and building a strategic consulting business.

Andersen Consulting continues to concentrate successfully on complex integration projects, automating business processes, and renovating or replacing those processes. Andersen's business has built on the needs of mainframe users, but senior management recognizes the importance of developing client/server expertise. Mainframe-based consulting will not disappear overnight, and the firm continues to train its people in COBOL, but Andersen's future success will be determined by its ability to provide client/server software solutions and integration services. Andersen does bring viable skills to the client/server arena, not the least of which is its Foundation CASE for distributed application development. Andersen's mainframe experience remains an asset since client/server projects typically entail process migration from legacy systems. The company has also become well-versed in wide-area and local-area network management.

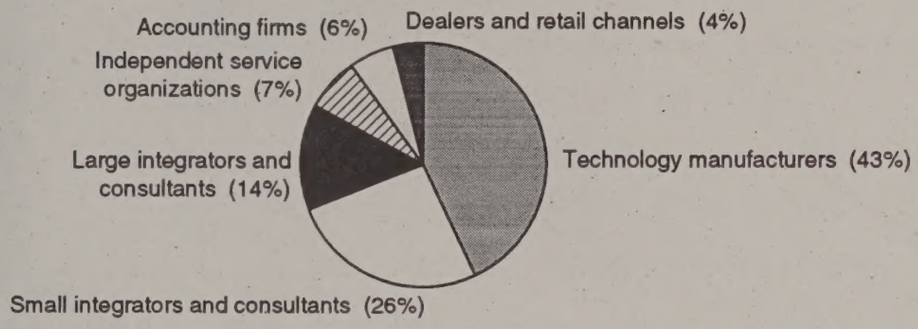
Given heightened CEO interest in determining the directions of IT, Andersen partners find themselves selling services to the executive suite rather than the data center. This opens the door to new business opportunities such as strategic planning, process reengineering, and even outsourcing. The firm's track record of making companies more competitive through technology is a leverageable asset. To succeed as a management consultancy, Andersen must position itself as a full-service provider. Hiring partners from consulting firms, which Andersen has done, is only part of the answer. The challenge is converting the firm's organizational culture from one dominated by technologists to one guided by strategists.

U.S. IT Services Market Share by Provider, 1987, 1993, and 1998

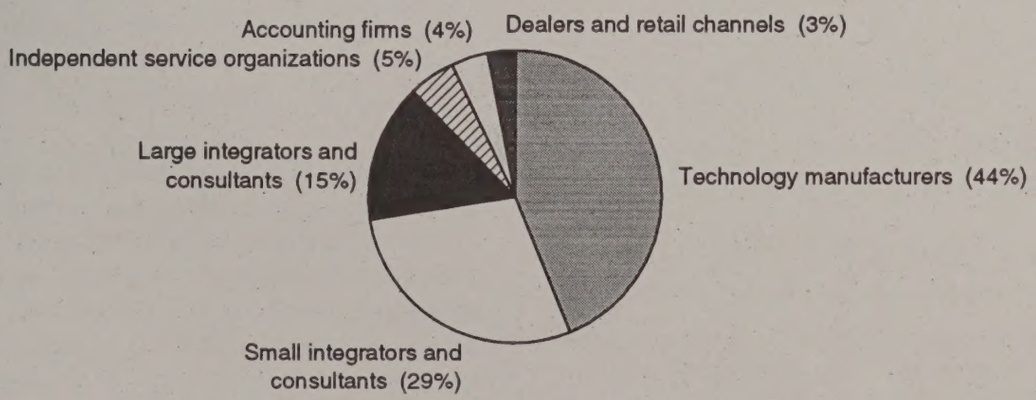
1987, $32 Billion


Accounting firms (5%)
Dealers and retail channels (4%)
Independent service organizations (8%)
Large integrators and consultants (12%)
Technology manufacturers (50%)
Small integrators and consultants (21%)

1993, $58 Billion


Accounting firms (6%)
Dealers and retail channels (4%)
Independent service organizations (7%)
Large integrators and consultants (14%)
Technology manufacturers (43%)
Small integrators and consultants (26%)

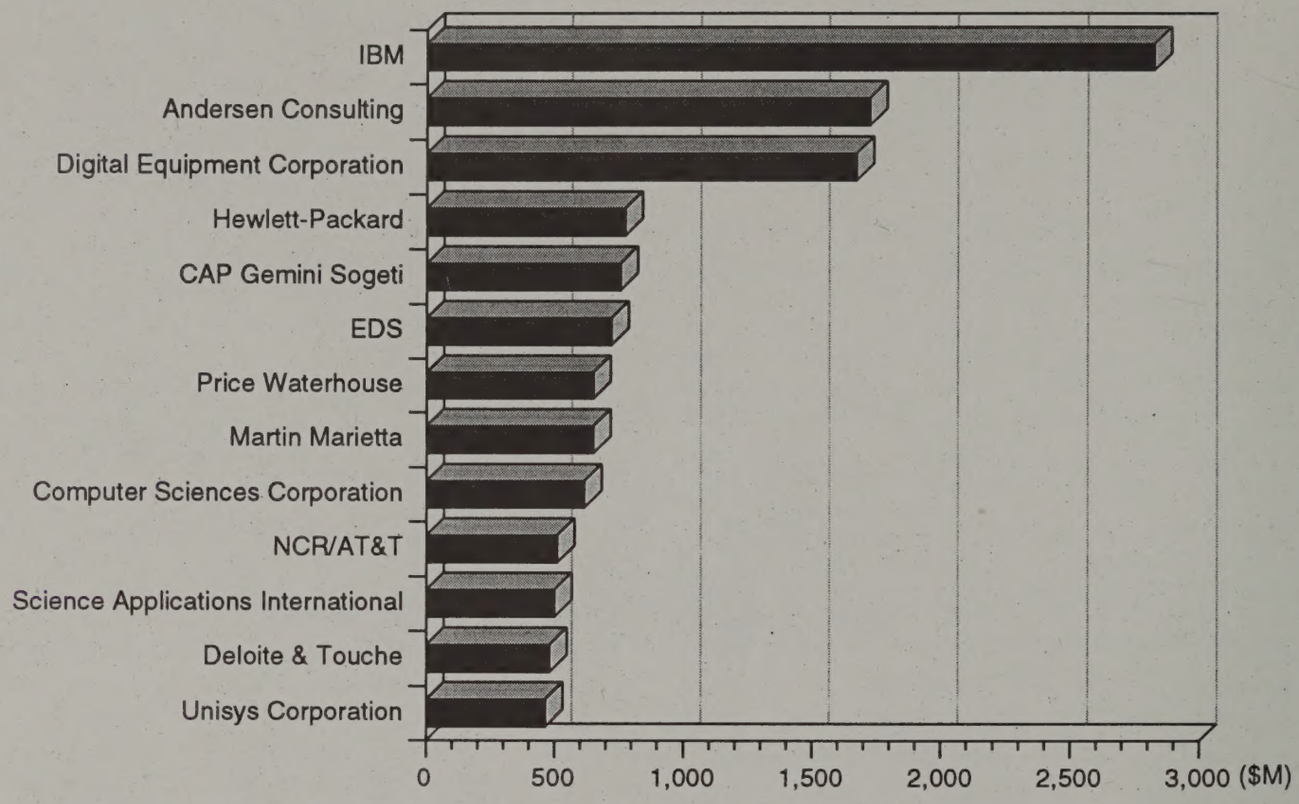
1998, $81 Billion


Accounting firms (4%)
Dealers and retail channels (3%)
Independent service organizations (5%)
Large integrators and consultants (15%)
Technology manufacturers (44%)
Small integrators and consultants (29%)

In 1987, hardware and software firms controlled half of the U.S. IT services market. By 1993, that share had tumbled seven percent, lost mostly to small integrators, VARs, and consultancies. Strong growth for small integrators should continue through 1998.

Source: International Data Corporation, 1993

Worldwide Systems Integration Revenue of Top IT Suppliers, 1993



Source: International Data Corporation, 1993

CAP Gemini

1992 Services Revenue: $1.8 billion

1993 Services Revenue: $2.0 billion

Key vertical markets: CAP Gemini is an exclusively commercial integrator and has purposely avoided public-sector clients.

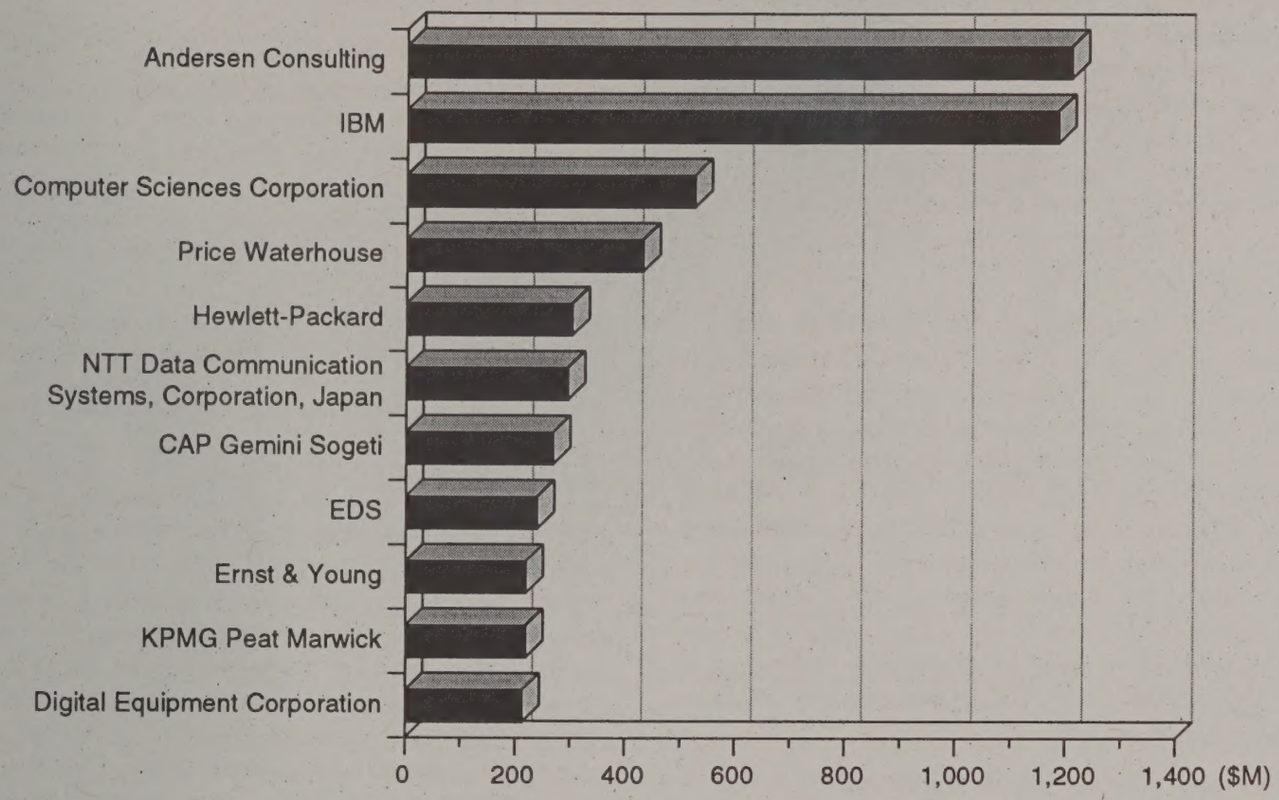
Other strengths: Software technology is the company's strength, opening the door to outsourcing opportunities in application maintenance and support.

Outlook: Plans to focus on ability to sell a comprehensive package of strategy, business processes, IT strategy, implementation, and ongoing support. The geographic reorganization paves the way for international expansion.

CAP Gemini derives most of its revenues from application software development. Its current diversity plans, which include integration and facilities management businesses, is to increase its attention to the integration business and compete with Andersen and EDS. To this end, the company has more tightly organized its resources. The application development business is more locally focused, and the organization is decentralized. The firm recognizes that a worldwide integration business must be more closely aligned across countries to better leverage skills, expertise, and direction.

The company is in the process of reorganizing into seven worldwide geographic divisions focusing on technology and vertical markets. All services will be organized under what are called the strategic business areas. CAP Gemini will fill the gaps in its skill set via partnerships in an effort to create a diversified full-service business. Acquisitions have not been ruled out. In response to customer demand and competitive pressure, CAP is seeking to develop/acquire

Worldwide IT Consulting Revenue of Top IT Suppliers, 1993



Source: International Data Corporation, 1993

expertise in the areas of outsourcing, network integration, and software reengineering.

CAP Gemini has particular interest in developing multiple services for the U.S. market. Gemini Consulting is the management consulting arm, and is located in New Jersey. A closer relationship with this organization will tighten U.S. business by integrating complementary expertise. Management consulting and systems integration blend into the strategic direction of a company.

Software development is CAP's strong suit, which is not surprising given its European roots. CAP will enter the outsourcing business by exploiting opportunities in application maintenance and support. The long-term strategy will focus on its ability to sell the entire package: strategy, business processes, IT strategy, implementation, ongoing support. The United States will be the proving ground for CAP Gemini's comprehensive consulting strategy.

Computer Sciences Corporation

1992 Services Revenue: $2.5 billion

1993 Services Revenue: $2.5 billion

Key vertical markets: The federal government remains the key market, with manufacturing a rising commercial target.

Other strengths: CSC is strong in the broad spectrum of outsourcing consulting/business reengineering and facilities management services that are well suited to the evolving needs of commercial customers.

Outlook: The firm needs to develop a more unified marketing image to compete more fully in the commercial sector. It will expand commercially, as well as diversify into high-growth areas, by means of acquisition. CSC's worldwide acquisition strategy has gotten mixed reviews, but will continue.

CSC has worked hard at transforming its image and has moved into the commercial space with an emphasis on client/server and communication technology. In recent years, CSC has established units to

handle nongovernment integration services. The Industry Services Group is responsible for facilities management. CSC Partners handles most of the commercial SI work, and CSC Index is involved in developing business reengineering concepts. The firm recently created a dedicated commercial outsourcing unit. CSC has forged a relationship with Sun Microsystems to target joint distributed computing opportunities in the aerospace industry. Other emerging areas of focus are workflow and object-oriented application development.

Diversification has not meant a diminished commitment to the federal government IT market. On the contrary, CSC remains a serious outsourcing player in the public sector, developing large-system integration and facilities management projects. Like EDS's and IBM's, CSC's enduring strength is its ability to maintain relationships with customers. To a large extent, the company will expand its expertise as the needs of its client base change, for example in the federal IT market. Given the Clinton administration's promise of downsizing government, CSC sees potential outsourcing business growth from government shrinkage.

Although CSC's federal image has been soiled somewhat by a 1993 EPA audit that resulted in the firm's paying a $2.1 million fine for overbilling, the company should survive any lingering embarrassment. During 1993, before and after the EPA uproar, CSC continued to bring in federal contracts from the Bureau of Land Management, the Naval Air Warfare Center, the Army National Guard, and others.

CSC has always been adept at tapping high-growth IT services market segments via acquisition. Its commercial U.S. business was built largely through acquisition (the Index Group). Its worldwide expansion continues to be fed by acquisition. CSC typically leaves management intact and allows new units to do what they do best. In fact, CSC has evolved into a truly decentralized structure. Lean, flexible, entrepreneurial divisions are the norm. The downside to this strategy is that in the commercial sector the absence of a unified marketing image may prove a drawback when CSC competes against commercial consulting powerhouses like EDS and Andersen Consulting. In Europe, where the firm is attempting to establish itself, a stronger commercial marketing message is critical to offset its U.S. public-sector supplier image.

EDS

1992 Services Revenue: $4.7 billion*

1993 Services Revenue: $4.9 billion

Key vertical markets: Key markets include government, energy, communications, financial services, manufacturing, health care, retail, and transportation.

Other strengths: EDS offers a wide range of services, including consulting, systems development, integration, systems management, and process management.

Outlook: Future goal is to differentiate its products and services and deliver on that promise in a cost-effective manner. The company needs to find a successful strategy that lessens its dependence on the U.S. market.

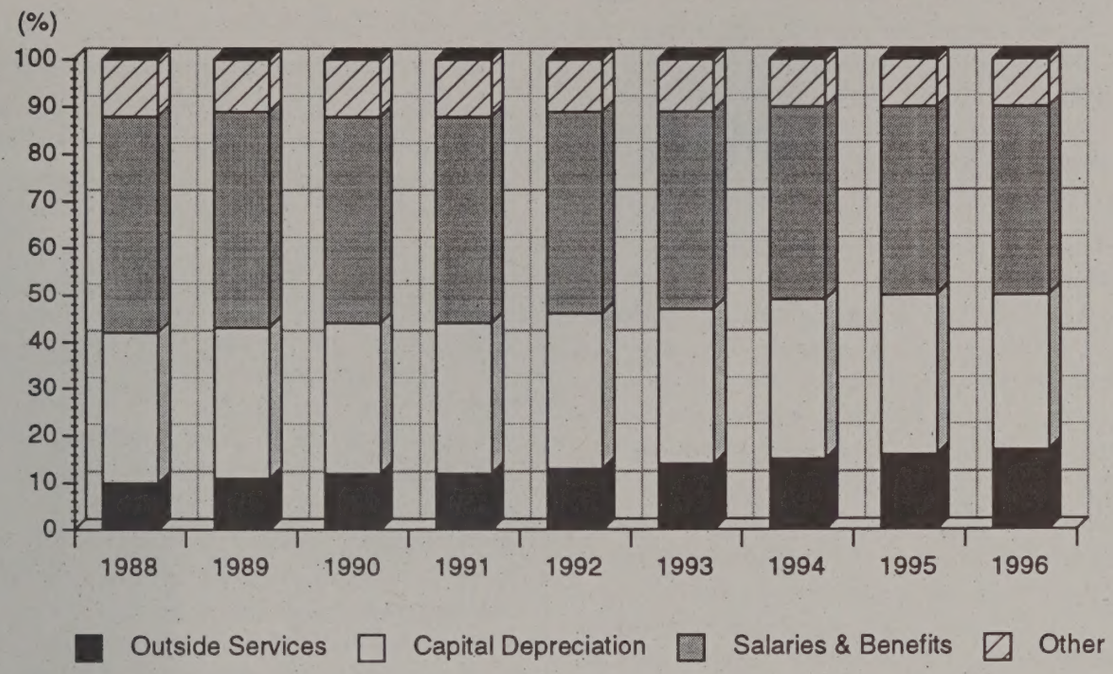
**Non-GM related*

EDS has more IT services experience than any other independent company. Only IBM rivals EDS in breadth of services. Outsourcing, referred to internally as systems management and process management, remains the focal point of EDS's business. As broadbased outsourcing becomes more popular, it should benefit EDS, although many believe that huge long-term contracts are in decline. EDS is organized around three basic dimensions: geographic businesses like Canada, Mexico, and the United States; vertical industries like banking, insurance, and transportation; and technology centers like client/server, LAN, and PCs. Each of the geographic regions and vertical industries are represented by strategic business units (SBUs) and are operated as profit-and-loss businesses.

EDS has a customer focus similar to that of large management consulting firms. It is organized to support individual industries and business needs rather than product lines or technologies. EDS has built its business on maintaining a firm knowledge of its customers' businesses and delivering results, enabling it to identify business opportunities, develop the right skills, and apply the appropriate IT. If EDS can develop leading-edge tools and experience in migrating legacy technology to new platforms, the company could leverage its outsourcing base and grow from transitional outsourcing opportunities.

EDS's Consulting Business Unit (CBU) Group became a full-fledged business unit in 1992. The consulting organization is expected to discover new markets, opportunities, and services for the firm. Additionally, management hopes to leverage its experience in systems development, integration, and

Major Components of the U.S. IS Budget, 1988–1996



The proportion of internal spending on IS staff has eroded over time whereas spending on outside services has increased. Among the different components of cost, salaries and benefits are still the largest of the IS budget. The primary cost advantage of outsourcing is the savings achievable through staff reductions or the avoidance of staff increases.

Source: International Data Corporation, 1993

management to improve business performance of its customers. The goal set for the CBU is to develop into a full-service organization capable of competing against leading strategic consulting firms offering change management, strategic planning, and business reengineering.

More than any other independent integrator, and in spite of the company's growing expertise in managing PC, LAN, and distributed computing installations, EDS is associated with mainframe-based computing. The company views client/server as something linked to the mainframe and other LAN-based environments. The experience of running and redesigning GM's operations has proven invaluable. EDS is pursuing application development through a joint venture with Hitachi Data Systems called Antares, which will create cross-platform application development environments. This should improve its application development ability, a critical component to helping customers run businesses better and meshing IT services with strategic planning.

Ernst & Young

1992 Services Revenue: $400 million

1993 Services Revenue: $500 million

Key vertical markets: The company has nurtured commercial sector relationships in insurance, utilities, banking, textile manufacturing, and entertainment.

Other strengths: Strategy, planning, and project implementation. The company is well positioned to serve multinationals.

Outlook: Key to future growth will be diversification beyond mainframe-centric business. Ernst & Young is positioned to do well in the emerging IT-based management consulting segment. Look for the company to take its business reengineering worldwide beginning in Europe.

Ernst & Young throws the bulk of its resources (development tools, methodologies, personnel) at improving business performance through reengineering projects and what the firm refers to as total quality management. Projects typically entail assessment, strategy, planning, implementation, and training. One of the big six, Ernst & Young's emphasis on business reengineering is its response to the needs of its client

base, largely Fortune 1000 and multinational corporations. Technology now pervades corporate strategic planning and teases companies with hopes of greater efficiencies. The company strives to help clients understand and advance the relationships among people, organizations, and information by building a new technology infrastructure and radically redesigning business processes.

Like its fellow accounting-born integrators, Ernst & Young built its reputation on large-scale system projects, much of it involving custom applications. Customer demand for client/server alternatives to large-system solutions has led the firm to develop the necessary resources to attack that segment. Software development tools play an integral role in that strategy. The Navigator systems development methodology, an automated tool for planning, designing, and building information systems, is integrated with KnowledgeWare's ADW CASE toolset, Texas Instruments' IEF CASE tool, and PowerSoft's PowerBuilder client/server development platform. Support for SAP AG's R3 environment will aid the company's assault on the European services market.

For now, the firm has not pursued outsourcing on its own. If a corporate solution requires an outsourcing component, Ernst & Young brings in outside expertise. IBM's ISSC has provided outsourcing services for the Continental Bank of Chicago to complement Ernst & Young application development and reorganization efforts.

Management Consultants

Information technology has become an integral part of the modern corporation and can be either a drain or a boon to cost structures; consequently, IT decisions are being studied in the board room as well as the data center. This higher-level decision making opens the door for those companies traditionally dealing with the CEO, the management consulting firms. There is a growing demand for IT strategy consulting among the client base of these firms. Recommending (which is not so new) and implementing (which is) these changes offers new, lucrative areas of growth for management consulting firms that seek to tie business strategy and operations to technology initiatives.

These players, however, do not yet have the requisite and demonstrable IT experience to compete. Acquiring personnel and expertise is essential for these consultancies. They must also demonstrate a willingness to enter into partnerships when necessary. This is a stretch, since management consultants try to remain as autonomous as possible.

Booz Allen & Hamilton Inc.

1992 IT Consulting Revenues: $96 million

1993 IT Consulting Revenues: $105 million

Key vertical markets: Energy and chemicals, engineering, manufacturing, and financial services.

Other strengths: Booz Allen also targets the federal government, but its government IT consultants do not report to ISG.

Outlook: Booz is well positioned to link business strategy to the implementation of IT because of its combined focus on IT strategic consulting and its ability to implement these strategies.

In the late 1980s, Booz Allen began to offer the implementation of its strategy recommendations, particularly those related to IT, instead of leaving it up to the client. The company formed its Information Systems Group (ISG) in 1989 to implement strategic IT recommendations. Booz Allen focuses on technology systems that are extremely important to the CEO: mission-critical and time-critical systems — it has no intent to become a full-service provider. The company specifically avoids activities such as applications maintenance, data center operations, and data center management.

Consequently, ISG focuses on strategic systems consulting and implementation designed to impact the organization in a major way. The firm will not commit to replacing a legacy system unless the change can be justified by a marked improvement in business performance. In Booz Allen's view, this distinguishes its work from the big six and systems integrators. Booz Allen is best positioned to link the business strategy to the implementation of IT because of its combined focus on IT strategic consulting and its ability to implement these strategies.

The firm has no defined partnership strategy, preferring to maintain as much autonomy and flexibility as possible. It will seek partnerships with suppliers and contract programmers for resources it lacks. Booz is more preoccupied with building skills. The company is actively exploring and hoping to apply advanced technologies such as MPP, neural networks, and object-oriented software development. To that end, Booz Allen has purchased a Thinking Machines CM-5 for the firm's new laboratory with the long-view goal of providing commercial applications on MPP. This constitutes a long shot since the company's development tools and skilled people are limited.

In 1993, Booz Allen won a significant four-year telecommunications support contract with the Gen-

eral Service Administration covering voice, data, and video communications, as well as tactical planning, design, cost analysis, systems integration, operations support, and training. Several government agencies including Health and Human Services, Education, and Defense are utilizing the firm's services.

McKinsey

1992 Services Revenue: $90 million

1993 Services Revenue: $96 million

Key vertical markets: McKinsey is a worldwide consultancy working with Fortune 500 firms and multinationals.

Other strengths: Recognized for expertise as a generalist, McKinsey also focuses on strategy, operations, and organization consulting.

Outlook: McKinsey strongly emphasizes providing IT strategy to its clients; however, it places little emphasis on implementation services, limiting its prospects in that segment of IT services.

McKinsey entered the IT consulting business with the 1989 acquisition of Information Consulting Group (ICG), a company formed by former Andersen Consulting partners. The purchase signified McKinsey's willingness to incorporate technology strategy expertise into the firm's suite of capabilities. Unfortunately for McKinsey, the acquisition ultimately failed due to a lack of support from throughout the company. Consequently, McKinsey did not incorporate IT consulting into the its core strategy offerings. The generalist partners simply did not see the value in the pursuit. Currently, McKinsey has fewer than 10 senior consultants serving on a leadership group of the information technology systems (ITS) practice.

Those partners committed to IT consulting see it as a golden opportunity, projected to grow at twice the rate of the rest of the firm over the next several years. It expects that the penetration of IT-related activities for its clients will also double. McKinsey views IT from a top-down perspective, starting from a need for business process redesign and resulting in the application of an IT solution as a key ingredient to that transformation. McKinsey pulls back from the integration and implementation end of the business except under specific circumstances. In an implementation scenario, the company usually helps its clients understand how to structure implementation projects, how to manage them, and how to maximize the success of these projects.

Other activities provided by McKinsey include change management, project management, and occasionally vendor selection services. Change management is geared to assisting senior management in redefining an organization. Project management aids senior executives in determining methodologies. Despite the obvious overlap, McKinsey does not wish to partner with large integrators. It refuses to share solutions it has developed with integrators and consequently does not participate in larger systems integration projects either as a primary contractor or a subcontractor.

Information in this issue of the *Gray Sheet* has been developed with the assistance of IDC's worldwide services research analysts. For further information on developments and changes in the U.S. services market, please refer to the following IDC research:

- *Systems Support Services Market and Trends*
- *Software Support and Integration Services Market and Trends*
- *Network Support and Integration Services Market and Trends*
- *Consulting and Management Services Market and Trends*
- *IT Training and Education Services Market and Trends*

Each report is available for $2,500; please contact Linda Rich at (508) 935-4389. For further information on worldwide services markets, please refer to these reports:

- *European Professional Services and Trends*
- *Asia/Pacific Professional Services and Systems Integration*
- *Latin America Professional Services and Systems Integration*

Please contact Linda Rich or you local IDC office for additional information.

The Widening Gap between IT Services: Suppliers Need to Move Carefully

The distinction between solving strategic IT problems and the outsourcing of value-chain processes is growing, and IT services suppliers are in the middle. The problem solving inherent in the former entails addressing primary bottom-line concerns of the executive suite. It encroaches on the turf of management consultancies. The latter encompasses the actualization and implementation of that primary decision making. How services suppliers confront this divergence of services will shape their fortunes for the rest of the decade.

The two markets at either end of the services spectrum are maturing concurrently, but for different reasons. Strategy-oriented services are typified by business process reengineering. Companies using BPR services address very fundamental questions about their firm and its strategy. Can the business be restructured around value-adding activities? Can IT be used to assist in the changes? At the heart of such activities are elemental questions about how the company adds and delivers value to its customers.

The outsourcing of IT functions is dovetailing into a broader trend: the outsourcing of entire business processes. In the early years of the IT services industry, companies like ADP created new businesses by assuming discrete tasks, e.g., payroll. For the most part, corporate users did not seek to offload other functions because they were not yet automated, and organizations still held to the credo that mission-critical functions needed to be done internally.

Managers of "virtual" companies are reevaluating every aspect of their business. Should a process be automated or eliminated? Can it be more cheaply and/or efficiently done offshore? A company can focus on its core products and services while farming out ancillary functions. Business process outsourcing is a growth segment with no discernible limitation. As long as providers can produce efficiencies and reduce cost structures, there is in theory no end to what corporations will outsource.

The divergence of services markets leaves traditional IT suppliers in a potentially perilous position. What makes IT companies and integrators think that they can provide both strategic business consulting and business process services? These are two very different activities requiring different skill sets, cost structures, and customer relationships. In some limited cases their experiences are directly relevant to one or both businesses they seek to enter. Mostly, though, they are not so much leveraging existing strengths as they are attempting to build new ones.

The popular focus on BPR and "virtual mania," combined with the abundance of technological choices now available in the marketplace, provide a great opportunity for services suppliers. However, bureaucracies die slowly, if ever. Most large organizations have focused on the data center for so long that they are ill prepared to evaluate and implement radically new ideas and systems.

CIOs expect business unit managers to perform this function, but they are typically busy just keeping things running. Hiring outsiders to provide the assessment and planning aspect as well as the implementation is often cheaper and more effective. With the help of consultants, management is determining what processes within an organization could be better managed or delivered by an outside supplier, and then outsourced. Both strategy and process services will grow quickly through the 1990s.

But IT suppliers must address these markets very thoughtfully. Companies that can turn specific vertical expertise into a launching pad will succeed. Digital's traditional strengths in manufacturing may predispose it toward entering manufacturing consulting and/or managing manufacturing processes for others. IBM's experience managing worldwide networks and its traditional strengths in commercial processing give it many leverageable skills. Such expertise positions a company well for entry into these new services opportunities.

Conversely, companies that have a broad strategy for competing in both kinds of services markets will be less successful. The golden opportunity for IT services firms is where IT consulting and integration, merged with strategic planning, lead to lucrative outsourcing contracts. But they are few and far between. And companies that attempt to do both, without focus, will end up straddling the widening gap.

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TP Systems and Software: Surprising Growth Despite Smaller Platforms and Increased Competition

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With worldwide systems suppliers desperate for growth in languishing systems markets, attention quickly becomes focused on market segments that show almost any level of expansion or potential for expansion. The markets for transaction processing (TP) technologies are such segments.

Information technology provides an ideal set of tools for performing transactions. Database management software is a means for creating, manipulating, and managing data. Application software describes the work to be performed in "real-world" terms. Transaction processing monitors arbitrate between applications requesting data and database management systems serving requests. All of this runs on hardware that executes transactions at rates of tens, hundreds, even thousands per second.

Historically, transaction processing has been closely associated with applications that process huge volumes of transactions, like airline reservation systems. However, the productivity of transaction processing technologies has increased dramatically over the past 30 years, with advances especially rapid during the latter half of the 1980s. This increased productivity has had two significant impacts. It has enabled more transactions to be executed "online" and in "real time"; consequently, the user of the system receives a response to a request in seconds. And, whereas transaction processing used to take place primarily between application and data resources on a single system, advances in the productivity and cost effectiveness of transaction, database, and networking technologies have enabled work to be more easily distributed across multiple systems.

Moreover, thanks to technologies like client/server computing and distributed database, it is becoming feasible — and in some situations practical — to apportion work across multiple database or hardware platforms. Two of the more likely topologies are the distributed-server transaction processing system and the distributed-database transaction processing system. In the distributed-server TP environment, an application requests work from the transaction manager, which, in turn, dis-

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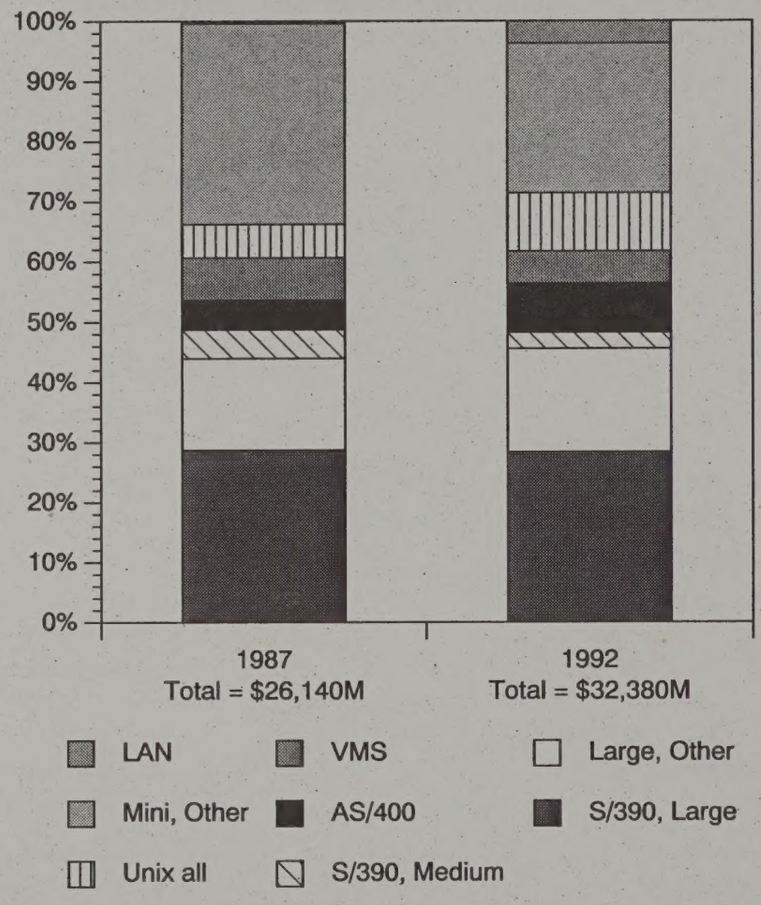
patches the necessary calls to numerous databases. The transaction manager ensures that no work is actually committed until all data requests are served. The application is hidden from the complexity of calling multiple databases. Such advances are causing widespread changes in the traditional uses of TP as well as in the markets for TP technologies. Consider the following:

- Data is moving closer to the user. Despite calls for integration, physical data centralization has not occurred. Indeed, users seem anxious to move data from hosts to distributed systems. Today, 83% of TP data resides solely on hosts; customer plans call for only 65% of TP data to reside solely on hosts by 1995. This does not mean that all data is moved off the host. It does mean, however, that most investment in resources for TP data will be off-host during the next few years. IBM/PCM sites are especially aggressive in this pursuit, which makes IBM/PCM suppliers especially vulnerable to this trend.
- No slowdown in the rate of adding TP applications. Development of TP applications continues at a fevered clip among TP users. Sites expect to add a median of 25% more TP applications to their portfolios over the next two years. Development is most aggressive at AS/400 and 43xx installations (after a protracted period of relative inactivity). If measured in terms of application counts, new development is much slower at IBM/PCM sites. However, other data indicates that TP programmers at IBM/PCM are spending more

Worldwide TP Systems Market by Environment



TP systems market growth has been most pronounced since 1987 in three markets: non-IBM mainframe, Unix, and LANs. The non-IBM mainframe market grew by 6.9%, largely on the strength of rapid growth by Fujitsu and Hitachi in Japan, and by Tandem's entrance into the mainframe market. The Unix TP market grew by 16.6% on the strength of suppliers like HP, IBM, NCR, and Sequent selling third-party DBMSs from companies like Oracle. LAN technologies have begun capturing TP market share too. Nearly a third of IBM mainframe sites involved in downsizing are targeting applications to LANs, including TP-intensive applications.

Source: IDC's 1993 Global IT Survey

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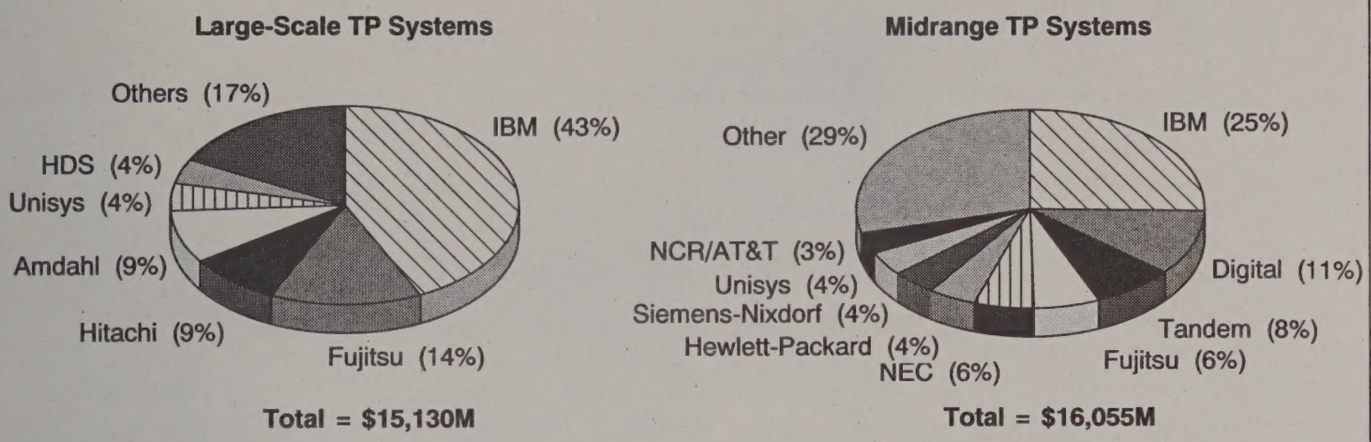
Vendor Shares of the Worldwide Market for TP Systems



Leadership in the worldwide TP systems market reflects leadership in the overall systems market, with some important differences. IBM, with a 34% share (43% large, 25% midrange), is the clear market-share leader in TP multiuser systems. IBM will find it very difficult to maintain its 34% stake. Although IBM certainly is gaining share in the worldwide Unix TP market, and its AS/400 product family continues to sell well in TP and non-TP environments, S/390 prices continue to fall, and demand for mainframes in general remains weak. IBM's very aggressive technology plans for its S/390 platforms — including the incorporation of CPU-based parallel machines to deliver extremely high transaction rates in CICS-, DB2-, and IMS-MVS environments — cannot be expected to completely reverse IBM systems' fortunes.

Source: IDC's 1993 Global IT Survey

of their time in new development than at other installations. We attribute this to (1) more complex applications and (2) the fact that at IBM senior system site developers often are developing applications for non-IBM/PCM systems.

- Need for higher availability of service. IBM/PCM sites already have requirements for service 24 hours a day, 7 days a week, for their TP systems. Customers at other senior system sites indicate aggressive expectations for availability improvements. Digital's VAX VMS customers have expected the greatest swing, going from a median of 17 hours a day in 1993 to 24 hours a day in 1995 (a situation that should temper enthusiasm for software migrations to Alpha machines). Unix customers are much less aggressive about availability. However, as Unix suppliers feature new availability developments in products, customers will emphasize availability. Among a variety of business requirements, "to operate continuously with no downtime" was the most important area to be addressed by all types of senior system sites. All TP vendors — hardware and software — will have to demonstrate strategies for improving availability over the next few years.
- Availability, transaction volume, and response time are most important business requirements. On a scale of 1-to-7, where one is not at all important and 7 is extremely important, customers across all senior-system-site types rated on average "continuous operations" 6.3, "more transactions/no service degradation" 5.9, and "increased speed in transaction handling" 5.8. IBM/PCM sites rated "reduce costs per transaction" at 6.0, higher than other sites. The likely reasons behind this are that (1) IBM/PCM sites often possess better cost per transaction data than other types of sites, and (2) costs per transaction are high at IBM/PCM sites.
- Users expect costs per transaction to decline 10% per year. Minorities of all IBM/PCM and Digital VAX VMS sites are the most pointedly cost-conscious group of TP sites. Digital sites are probably more cost conscious because of Digital's aggressive Alpha price/performance promises. IBM/PCM sites have been among the most cost-conscious sites for years.

The net result of these changing requirements is that transac-

tion processing technologies will become increasingly important in business. Transaction processing (TP) is ascending to a position of primacy in the computer industry. Competition is forcing business to focus on customers and the need to simplify and reduce the complexities and costs of transacting business. Markets for transaction processing tools — systems, TP monitor software, and database management software — are among the most competitive in the industry. In this issue of the *Gray Sheet* we examine the size and dynamics of the markets for TP technologies and profile some key TP monitor suppliers.

The Transaction Processing Systems and Software Markets: Five-Year Outlook

The worldwide market for transaction processing systems is growing faster (or dropping more slowly) than the market for worldwide multiuser systems. Between 1987 and 1992, the total multiuser systems market grew at a compound annual rate of 4.2%; the TP systems market registered a 4.4% CAGR. The three environments that suffered declines in worldwide TP systems market share over the past five years are the IBM mainframe, VAX VMS, and "other minicomputer" (other than Unix, AS/400, and VAX VMS) environments. TP systems market growth was most pronounced in three environments: non-IBM mainframe, Unix, and LANs.

Two software technologies have been especially important to transaction processing: database management and transaction monitor. Hardware companies like IBM, Tandem, and Fujitsu traditionally have maintained a strong hold on the TP software market, but in recent years independent software vendors like Oracle, Ingres, Informix, and Sybase have made significant inroads on the database market. In contrast, no third-party supplier of transaction monitor software has yet emerged. TP monitor software has been sold primarily on high-end systems from companies like IBM, Amdahl, and Fujitsu. Nonetheless, TP monitor software for distributed systems will emerge as a primary force in the TP market over the next five years.

- In 1992, the market for transaction processing hardware, which IDC defines as including systems and DASD, was $32,380 million, a drop of 1.7% from 1991's $32,915 billion figure. Pricing pressure and demand shortfalls in mainframes was the primary cause of the drop. Although this certainly represents mediocre performance, it was better than the -2.2% drop in worldwide multiuser systems revenue overall.
- IBM is the leading supplier of TP systems, owning 34% of the market. A shrinking market for mainframes will put significant market share pressure on IBM over the next five years, despite gains expected to be registered by both its AS/400 and RISC System/6000 product families.
- In 1993, the TP systems market is expected to shrink for the second straight year, again because of weaknesses at the high end. Current projections call for a drop of -0.2% to $32,325 million, which again is still better than the -1.0% drop in the total worldwide multiuser systems market.
- IDC believes the worldwide TP systems market will recover, growing to $35,340 million by 1997. This represents a CAGR of 1.8% a year, a very healthy number during a period of overall slower shipment growth and drastic price reductions.
- IDC estimates that the worldwide market for TP database in 1992 was $1,725 million. In 1993, this figure is expected to grow nearly 16% to $2,000 million.
- The IBM/PCM mainframe environment of the TP database market accounts for the largest segment of the market by far. About 50% of the worldwide market for TP databases is tied to the IBM/PCM segment. This figure is much larger than the 28% share of both the worldwide TP systems market and the 38% share of the worldwide database market. Both the high costs of database management software and the overall greater TP emphasis on IBM/PCM mainframes contribute to these anomalies.
- By 1997, the worldwide market for TP database will grow

to $3,295 million, an aggressive growth rate of 15.7% per year.

- The strong growth in the relational database segment is not surprising. According to IDC research, about 44% of commercial processing sites in the United States currently say their TP applications are based on a relational database. AS/400 (73% of senior system AS/400 sites) and Unix sites (51%) are the primary proponents of relational database and TP.
- In 1992, the worldwide market for TP monitor software, including packages like IBM's CICS, Digital's ACMS, USL's Tuxedo, and NCR's Top End, was $1,080 million.
- IBM is the leading supplier of TP monitor software. The company's CICS product family commands a 54% share of the $1,080 million worldwide TP monitor software market, which equals $580 million revenue to IBM. Nearly all of this revenue is tied to S/370 or S/390 products.
- By 1997, the worldwide market for TP monitor software will grow to $1,405 million, a compound annual growth of 5.4%. Behind an aggressive yet achievable strategy and solid customer demand, IDC believes CICS's share of the market will grow to 64% by 1997. This, obviously, would enhance the position of CICS as the industry's de facto standard for TP monitor services.

TP Monitor Supplier Profiles

The TP monitor software market is not the largest component of the worldwide market for transaction processing technologies, but it is one of the most influential. Precisely because TP monitor technologies are crucial intermediaries between transaction processing applications and transaction processing resources, vendor strategies and user adoption patterns within this segment of the TP market will greatly determine the direction of other transaction technologies. The profiles that follow first highlight X/Open's Distributed Transaction Processing (DTP) model standards initiative in the TP arena, and then focus on TP monitors from three vendors: IBM's CICS, Unix Software Lab's Tuxedo, and NCR's Top End.

X/Open Distributed Transaction Processing (DTP) Model

X/Open has labored to develop vendor-independent application frameworks since the mid-1980s. To deal with the uncertainties of network performance — from the standpoints of both availability and response time — X/Open recently extended its TP model to better describe the behavior of physically distributed, logically unified transaction processing systems. This newer model is known as the Distributed Transaction Processing (DTP) model. DTP comprises four APIs, each detailing the boundary and boundary behavior of a different class of function:

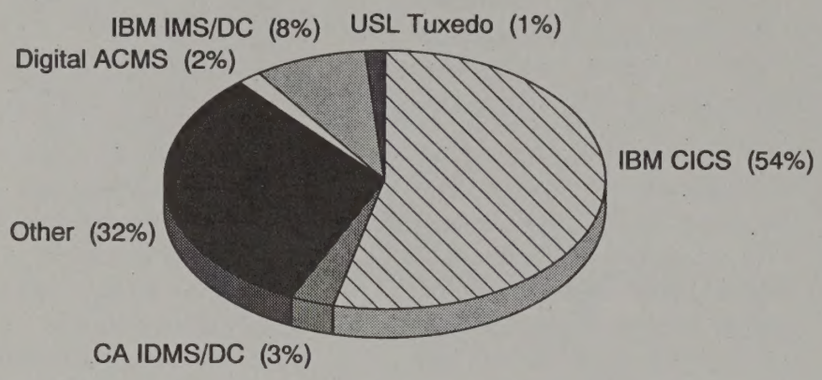
- XA continues to evolve, but still describes the interface between Transaction Managers and Resource Managers.
- XA+ defines the manner in which Transaction Managers will invoke and exploit the services of Communication Managers, which are themselves descriptions of standards-based networks.
- TX articulates the interface between applications and Transaction Managers. The protocols and conventions of TX enable transactions to be defined and executed at run time.
- TX extended is a "peer-to-peer-oriented" interface that describes how two applications may communicate or share data in a way that relaxes the regimen of transaction services without completely sacrificing availability and integrity. As is often the case, disagreement among technology suppliers has caused X/Open to delay the publishing of key interfaces like XA+ and TX extended. However, X/Open has committed to releasing working documentation for these interfaces during 1993.

IBM CICS

IBM's CICS TP monitor is the dominant TP monitor in the market in terms of revenues, licenses, and number of programmers familiar with its use. In the face of that dominance, a number of third-party software houses have

Information in this issue of the *Gray Sheet* has been excerpted from IDC's report, *Transaction Processing: Systems, Databases, and Middleware.* The report provides an in-depth analysis of many of the trends, issues, and forecasts found here. For further information please contact Linda Rich at (508) 935-4389.

1992 Worldwide TP Monitor Market Share



Total = 1,080M

Given the traditional tie between high-end systems and TP monitor software, it isn't surprising that IBM's CICS should be the TP monitor market leader. Although IBM has shipped approximately 10,000 copies of CICS on to OS/2 machines as a front end to distributed TP applications, IDC estimates that this accounts for less than $2 million of IBM's CICS revenue.

Source: IDC's 1993 Global IT Survey

delivered tools that emulate a significant portion of CICS on non-IBM platforms. Sensing opportunity, IBM has been establishing relationships with other suppliers to introduce CICS on their platforms. Hewlett-Packard, Apple, Microsoft, and Novell are progressing with other relationships under development. Currently, CICS is supported on six IBM platforms: MVS/ESA, MVS, VSE, OS/400, AIX/6000, and OS/2. Additionally, through the aforementioned relationships with HP and Apple, CICS function will be delivered on at least three other platforms: HP UX, HP MPix, MacOS, and NetWare. As is the case with IBM, these non-IBM implementations are expected to exploit the unique capabilities of each system. The MacOS version of CICS is expected to be a client version only, in that it will provide the means for MacOS applications to access CICS transactions running elsewhere. The foundation for the OEM versions of CICS will be CICS/6000. IBM intends to provide complete support of X/Open's DTP model in the CICS OEM product as well as additional capabilities that support more standards and new technologies.

IBM faces three significant challenges in the TP monitor market:

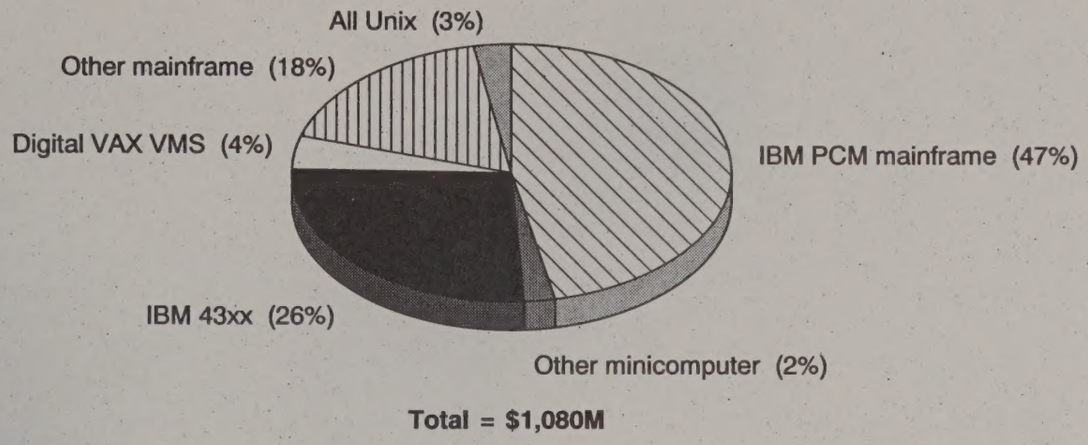
- The challenge to be "open" as the company works with key systems, database, networking, and application suppliers. IBM must recruit and retain a broader range of technology suppliers, particularly database suppliers, if it is to maintain market leadership.
- The challenge to drive CICS into the low end of the market. IBM will have to employ new merchandising practices, including lower prices and new distribution channels.
- The challenge to maintain and even consolidate the current set of common CICS facilities. Although users clearly want to exploit the strengths of individual platforms, they do not need to be exposed to multiple, platform-unique means to realize common ends. IBM will have to work across all its product lines to a high degree of uniform CICS support.

USL Tuxedo

Tuxedo is the most widely installed TP monitor on Unix systems today. Unix Software Labs (USL), the developer of Tuxedo, installed the bulk of its licenses, perhaps as much as 80%, within the Bell system telephony companies derived from AT&T, the previous owner of USL and Tuxedo. Recently, USL was purchased by Novell, but Tuxedo was a peripheral concern. IDC believes Novell was primarily interested in procuring the Unix trademark and USL's development expertise.

At the core of Tuxedo ETP is Tuxedo System/T, sometimes referred to as "slash-T." System/T shares much with other TP monitors, such as an API, here known as Application-Transaction Monitor Interface (ATMI). The technology diverges in the areas of client/server communications services, such as a naming service, not found in other TP monitors. The advantages of the System/T approach are that the transaction monitor can act as an intermediary for a wide variety of requests for external services and that those external services can be supplied with transaction-level integrity. USL claims that more than 50 hardware and software resellers are developing or have developed System/T-compliant products. About 50% of these are hardware vendors, making System/T the TP monitor most widely supported by hardware vendors. IBM, too, has announced its intention to bring System/T to AIX/ESA. IDC

1992 Worldwide TP Monitor Revenues by Environment



Total = $1,080M

The IBM/PCM market, including mainframe and IBM 43xx segments, claims nearly 75% of the TP monitor market. According to IDC research, this same segment accounts for only 38% of the total worldwide DBMS market. By contrast, Unix accounts for only 3% of worldwide TP monitor sales, but 19% of DBMS sales.

Source: IDC's 1993 Global IT Survey

believes that USL faces two major challenges with Tuxedo:

- Defend Tuxedo's leadership position within the Unix market, particularly in the telephony segment it dominates and its competitors are targeting.
- Recruit additional and enhance existing OEM support. To expand its market presence, Tuxedo must be sold aggressively by database companies. To date, Tuxedo has received nominal attention from database ISVs. The tie between USL and Novell offers potential through integration with NetWare. However, integration will not be without difficulty given the overlap between the client/server technologies found in NetWare 4.0 and Tuxedo. Rationalizing these two sets of functions will require complex trade-offs and spawning development, organizational, channel, and customer costs. Novell's ability to integrate USL over the next 12 months will have significant impact on Tuxedo's future.

NCR Top End

NCR plans to be one of the aggressors targeting Tuxedo. Its weapon is Top End, NCR's Unix-based TP monitor technology developed in 1990 for its System 3000 family of systems. Although Top End has not emerged as the alternative to IBM's CICS — where AT&T and NCR ultimately hopes to succeed — it has received solid support from key database OEMs like Oracle and Informix. System vendor support originally lagged, but Top End currently is available on HP-UX, Sun, and Pyramid platforms. Presently, NCR claims that about 500 copies of Top End are installed at various sites of approximately 50 customers.

From a technology standpoint, Top End is perhaps the TP monitor that is most consistent with X/Open's DTP model. Top End's strong affinity with the XA+ interface specification is one of the chief reasons the product has received support from DBMS vendors. Recently, NCR released Top End 2.0. This new version enhances Top End's interfaces to CICS and IMS applications, including 3270 terminal support, and incorporates new features, such as Automatic Throughput Optimization (ATO), to improve resource utilization. Driven by parameters chosen by administrators, ATO manages the number of executing copies of server and application resources. While these technologies generally are not new to the TP monitor market, their introduction is an indicator of NCR's ability to drive critical TP monitor technology into Top End rapidly. Nonetheless, Top End's late entrance into the TP monitor market presents NCR with numerous significant challenges.

In IDC's opinion, all such challenges are secondary to one: Top End must dislodge Tuxedo as the leading Unix TP monitor before it can expect to compete seriously with CICS. This context will be joined in telephony accounts — where NCR's relationship with AT&T could be a major positive — and OEM channels. Displacement of a few high-profile Tuxedo applications and stronger OEM systems-vendor support is crucial to the long-term prospects of Top End.

General Business Dynamics and the Impact on TP

In at least two important ways, general business and IT market dynamics are becoming tied together. First, as IT technologies spread into every corner of organizations, business evolution and IT evolution become inextricably linked, and changes in one require or demand changes in the other. Second, as the computer industry matures, it will no longer grow two to three times faster than overall economies. As a result, competition in the IT industry will increase dramatically. Battles for market share will heighten. Prices will drop; product standardization will increase; suppliers will attempt to enhance embedded functionality; distribution systems will evolve to favor low-cost, high-volume sales; and quality will become a key feature of attempts to differentiate goods and services.

Changes in business strongly favor the transaction processing market. Specific TP market sectors — such as the TP systems market, TP database market, or TP systems integration market — will grow faster than either respective general IT markets or economies in general. Moreover, because of increased competition, TP suppliers will evolve to be more responsive to channel and customer needs.

Business thinking and strategy have evolved dramatically over the past half century, in part as a consequence of applying IT to business challenges. From 1950 to the mid-1970s, bureaucracy was the chief organizational form of business. The care and feeding of capital was the chief principle used for structuring organizations. Automation became the primary objective of IT. Subject to all of these forces, IT was organized to maximize the productivity of the capital-intensive mainframe computer.

From the 1970s to the late 1980s, the costs of capital dropped significantly. Strategic thinking shifted from issues like scale efficiencies in production to portfolio management. Strategic options were evaluated according to growth and share potential. Terms like "rising star" and "dog" were introduced to describe strategic options. Business searched for ways to maximize data access to support efficient report generation and to minimize entry, mobility, and exit barriers in industries. Personal computing and data integration became the dual — and sometimes inconsistent — objectives of IT. Data was the dominant asset in IT — if not in practice then at least in theory.

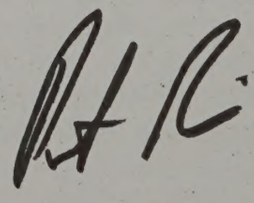
Today, we are in the midst of another major shift in perspective. The current rethinking, however, probably is more fundamental and long lasting than previous shifts. The era of the conglomerate is giving way to a new focus on product and process quality. Companies are spending less time looking for "rising star" opportunities in mature markets and more time finding ways to increase productivity, profitability, and share through higher-quality processes and products. The thinking is that if more attention is paid to quality early in the production process, fewer resources have to be devoted to integration, testing, support, replacement, and rebuilding customer relationships.

Terms like "franchise" and "total quality" are being introduced into the lexicon of business to describe the techniques of maximizing customer relationships. The new emphasis is on making business easier to transact. This requires more appropriate information, easier selling engagements, lower-cost transactions, and more efficient support infrastructures.

Information access as the primary objective of database is giving way to information delivery. Store fronts are giving way to anywhere, anytime shopping outlets. Information delivery and anywhere, anytime shopping are impossible without transaction processing technologies that support, on the one hand, more complex transactions and on the other, more reliable, always-available transaction processing systems. Many organizations are beginning to place transaction processing applications at the center of their IS structures.

Increasingly, transaction processing technologies will be embedded in an expanding variety of applications. TP will be used not only to perform traditional types of work like check processing, but will be found in situations where delivery of information or an information service must be guaranteed to ensure customer satisfaction.

The emphasis on transaction processing will require exploitation of distributed processing power. Whereas previously desktop and LAN-server machines supported personal-productivity types of applications, they will evolve to become integral to mission-critical application processing. The emerging emphasis on customer relationships as the central asset will force many new requirements on TP technologies and transaction-oriented information systems. Of greater interest than *whether* TP technologies will grow will be *how* — and how much faster than overall IT — they will grow.



THE GRAY SHEET
Computer Industry REPORT

DOUG McLEOD, EDITOR | December 31, 1993 | VOL. 29, NO. 4 | Published continuously since 1964.

1993 IT Story of the Year: U.S. Market and Suppliers Dominate Industry Growth

Assembling a review of the most significant IT events from the previous 12 months ranks among our most difficult, and most enjoyable, tasks. Every year analysts at IDC, the publisher of the *Gray Sheet*, review thousands of new products. They initiate research into dozens of new trends. From their work this past year we have culled a list of ten stories that highlight the state of the industry and lay a groundwork for 1994's twists and turns.

In assembling this list we have attempted to focus on overall market developments, not on product announcements. As a result, Apple's overall troubles make the list although Newton's specific problems do not. Likewise, AT&T's purchase of McCaw does not make it (even despite its potential to spawn new products for IT suppliers), but AT&T's overall expansion merits a place as an also ran (see page 6). The one notable exception would be NT's release; however it is included because its impact is far broader than that of any other single product.

Though it might appear that U.S. suppliers and the U.S. market had a lock on the good news in 1993, that's not necessarily true. The countries that IDC groups into its rest-of-world category continue to represent the fastest-growing IT markets anywhere. This includes Latin America, the smaller countries of Asia, Eastern Europe, and the Middle East.

U.S. companies led the overall growth that was admittedly U.S. based; nevertheless, there are many international success stories. From the growth of component suppliers in Indonesia, to the emergence of software suppliers based in India and China, to ICL's resurgence, to CAP Gemini . . . . many non-U.S. companies are thriving in the general disarray of non-U.S. markets.

None of these stories made their way into our top ten. But that neither means that we are overlooking their importance nor that we are belittling their achievement. Japan and Europe remain significant portions of the worldwide IT market and represent huge opportunity for the right products and services. With ROW growth rates much higher than the overall worldwide IT growth, these markets will only become more important in 1994. The past year has been good for U.S. markets and suppliers, but that's not to say that 1994's excitement will necessarily take place there again.

The Gray Sheet's 1993 Top Ten

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10 Suites: Taking PC Application Price Wars to a New Level

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IDC International Data Corporation
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U.S. Surges, Europe Stagnates, Japan Slumps; U.S. Suppliers Strong; Japanese and European Suppliers Struggle

The continued strength of the U.S. IT market in 1993 and that of U.S.-based IT suppliers were the most striking developments in the worldwide IT industry over the 12 months of 1993. Europe has remained mired in recession for much of the year, and the Japanese economy is constricting in remarkable jolts. As a result, the U.S. market has been primarily responsible for the industry's overall growth. Among IDC's preliminary 1993 findings:

- Growth in the U.S. market doubled (7.8%) the worldwide growth rate (3.9%) from 1992 to 1993. The U.S. accounted for 39% of the entire worldwide IT market during the past 12 months.
- In stark contrast to the United States, the Japanese IT market declined by 4.5% and accounted for only 16% of the total worldwide market, according to our preliminary estimates.
- The European market was neither quite as good as the U.S. market, nor nearly as disappointing as Japan's 1993 results. It registered 1.6% growth and dropped marginally to 33.0% of the worldwide IT market.

Not surprisingly, U.S.-based vendors solidified their grip on IT markets in the United States and Europe. In fact, the fortunes of major systems suppliers generally mirrored results in each region. European suppliers turned in an overall flat performance while

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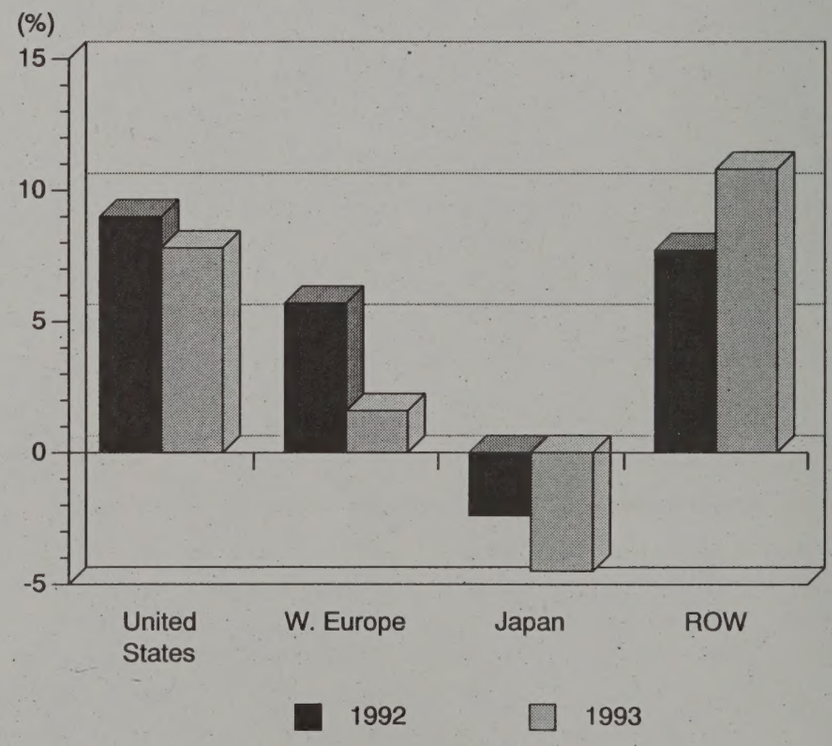
1992 and 1993 IT Market Growth Rates by Region



Source: International Data Corporation, 1993

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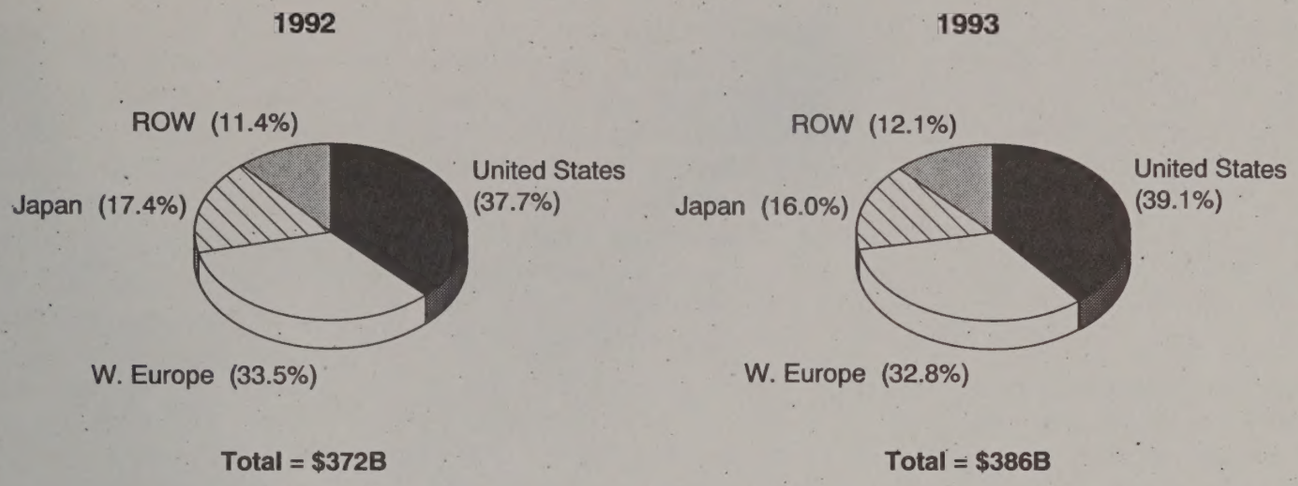
Worldwide IT by Region, 1992 and 1993 (projected)



Source: International Data Corporation, 1993

Japanese suppliers languished. Consider the following:

- Through the first three quarters of 1993, IDC's database of U.S.-based vendors grew by 7.5%. Without IBM, the group would have achieved 14.5% revenue growth over 1992 for the first three quarters of 1993.
- European suppliers fared much worse. Groupe Bull's European revenue was off by 9%, SNI's by 5%. Olivetti scratched out a tiny increase — ICL was the only bright spot for European vendors.
- The overall fortunes of Japanese-based IT suppliers fell by almost 12% in 1993 from 1992. The story is a shocking reversal to the global IT-industry domination story that was popular in the trade press a mere five years ago.

The surprising strength of the U.S. market is more a result of European and Japanese recession than any inherent U.S. advantage. However, Western European and Japanese markets were particularly vulnerable for two reasons. First, their price floors have been significantly higher than those of the United States, so they had further to fall. Second, growth had been so much stronger than in the United States that users have a comfortable cushion of recently acquired products to fall back on during the worst economic crisis in years.

However, U.S. vendors are achieving better results overseas than the performance of international IT markets would suggest. They are gaining share against their local and other foreign competitors. There are several explanations:

- The real or perceived technology edges for U.S. IT companies.
- The structural advantage of U.S. suppliers, the most successful of which are focused on discrete niches. European and Japanese suppliers tend toward the monolithic, general-purpose business computer model.
- The shift in IT spending toward software and services, areas where U.S. companies are dominant.
- As in Japan, the erosion of local proprietary standards.
- The growing significance of interregional and global marketing, at which U.S. companies have been most successful.

In summary, U.S. companies have managed to exploit their competitors' economically weakened state to increase worldwide market share. Although the U.S. suppliers have certainly been doing some things right, they were not completely responsible for their success. They might be foolish to assume that the events that combined to produce such an outstanding 1993 will return in 1994.

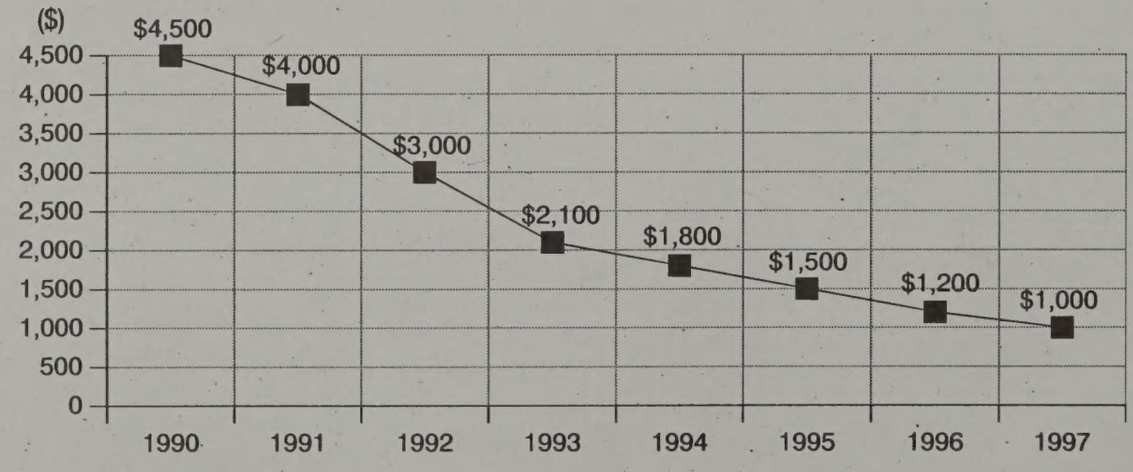
The Multimedia House: Home Market Bursts Open with New Devices in 1993

That more technology is used in more homes than ever before is chiefly the result of more people working at home and the development of home entertainment/PC products that are driving a new category of growth. These two developments combined to make the home market a target for almost every technology company in 1993.

On the entertainment side, 1993 was the year that the much-rumored marriage of consumer electronics with PCs was finally consummated. A host of new products revolving around the previously nebulous concept of multimedia were introduced, and a burgeoning library of multimedia titles began lining the shelves of the local software store. Among the more significant announcements:

- Perhaps no single event better serves to highlight the new marriage than the early fall introduction of the 3DO multiplayer, a graphics-intensive, CD-ROM-based PC and game machine built around AT&T's Hobbit microprocessor. The multiplayer is the best example of the convergence of home entertainment with office PC technology. When cable TV terminal functionality is introduced (via Time/Warner sometime in 1994) the multiplayer will offer more than any competitive product.
- Compaq introduced a line of PCs for home and home office buyers called the Presario. The integrated monitor/CPU device is a driving force behind Compaq's strong home sales in 1993.
- Sega and Nintendo took the home game machine competition to a new level in 1993: 32-bit. Sega appears to have the upper hand as Nintendo has had greater problems transitioning from 16-bit game sales.
- The Macintosh's late 1992 makeover played well at home in 1993 where Apple's sales took off. Viewed by many as the ultimate home computer, Apple CD-ROM machines have been leaders in integrating video in PCs with the release this fall of MacTV.
- The meteoric rise in the value of software companies with some experience publishing multimedia titles or services (such as Broderbund, Electronic Arts and America Online) slowed by midyear, but was indicative of the overall interest in consumer titles.
- AT&T invested in Sierra's ImagiNation network game.
- Microsoft released the "Encarta" geography CD-ROM to high acclaim.
- The Mortal Kombat game was so lifelike that popular outcry forced game suppliers to announce the imposition of their own rating system, similar to that of the motion picture industry.

U.S. Consumer PC Market: Multimedia PC Price Trend



The decreasing costs of multimedia PCs may not be low enough to threaten products at more traditional consumer electronics price points until 1997, or beyond. As consumer products incorporate more PC technology (like 3DO's and Sega's CD-ROM) and PCs take on consumer price points, the difference in the two classes of devices will disappear.

Source: LINK Resources Corporation, 1993

Worldwide PC Hardware: The Rich Get Richer

After several years filled with stories touting the upstarts transforming the PC industry, 1993 proved to be a year dominated by the feats and follies of the veterans. And on balance, it proved to be a notable year for the established powers of the industry. Nine of the top 10 vendors in the U.S. market gained share and grew at a rate exceeding the overall U.S. market unit growth of 26%. Seven actually saw unit shipment increases of 50% or more. Similarly, eight of the top ten vendors saw shipments grow at or above the worldwide rate of 19%. The industry is consolidating, and the largest 15 or so vendors are picking up the lion's share of market growth.

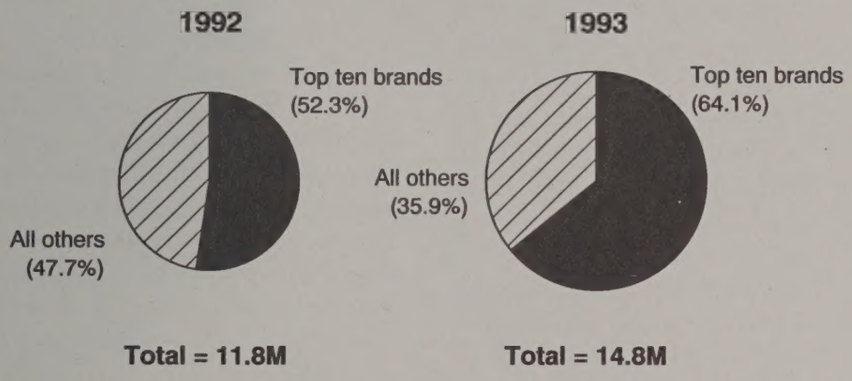
IBM solidified its position as the number one worldwide vendor, gaining 1.6% of worldwide market share and 2.4% in the United States. Strong growth in its ValuePoint and ThinkPad lines, rising sales of the PS/1 through mass market channels fueled this turnaround and moved it slightly ahead of Apple in its race for the top spot. Corporate loyalty to the PS/2 did not diminish, contributing to IBM's sales strength.

Compaq signaled its return to prominence, boasting the fastest growth among the top 10 and rising 110% in the United States — and nearly doubling its sales worldwide. The company has successfully made the transition from a high-margin, high-cost business model to one emphasizing lower prices, lean expense levels, and much higher volumes.

Apple's strong second half helped offset a bevy of well-publicized problems in 1993. The strong stretch run was driven by lower prices and new products and propelled the firm's worldwide sales upward by 30% for the year, with U.S. unit shipments rising 32%. Lower prices, new products, record sales to the education market, and a projected 56% unit shipment rise in Japan were primary factors in Apple's worldwide growth.

Dell, a former upstart and now part of the establishment, rebounded from its own troubles, posting strong desktop shipments that counterbalanced the meltdown of its notebook business. In fact, Dell's U.S. and worldwide shipments both grew at a better than 75% clip, resulting in improved market share.

U.S. Unit Shipments of Top Ten PC Brands
1992 and 1993 (projected)



Source: International Data Corporation, 1993

Worldwide Unit Shipments of Top Ten PC Brands
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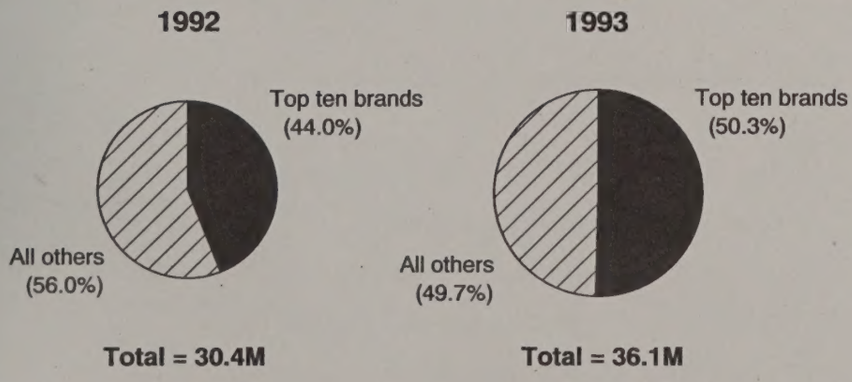


Source: International Data Corporation, 1993

Windows NT Released to Fanfare, Derision, and Greatly Exaggerated Rumors

Some of the most interesting stories of the year revolved around Microsoft (see also "Suites," p. 10). The jury is still out on the second-most-awaited product of 1993 (after Newton), Microsoft's Windows NT, but that hasn't slowed the steady stream of predictions of NT's demise.

NT is not the first Microsoft product to crawl before it ran. Windows moved at a snail's pace for the first two years of its existence. Eventually it did pretty well. Likewise, NT will need at least two years to prove its mettle. Some key points to keep in mind:

- NT has plenty of time. Three or four years is nothing when it comes to establishing an operating system standard. Windows was introduced in 1985. Unix has been around for 20 years. Microsoft has a long time to cover the long distances it needs to travel to make NT commercially successful.
- NT is an example of the portability that will characterize future operating systems. It may be the very first OS to be truly portable (defined here as a single set of specifications and APIs for a multiple-processor OS) since Unix doesn't really count. This will be a great advantage. If and when Unix does achieve real portability, it and NT will emerge as leading candidates to dominate the very wide space between low-end PCs and supercomputers.
- NT may suffer from lack of focus. One of Microsoft's most significant challenges is its current schizophrenic diversification. It has always been a PC operating system and PC application company. Now it is trying to be those and much more. It has invested heavily in NT as well as in consumer-oriented applications and environments. Can it do all three? Will NT suffer if Microsoft becomes highly successful at the low end?

The mere release of Microsoft's much awaited 32-bit operating system has had a profound effect on the behavior of almost every IT supplier and user in 1993. However, Microsoft no longer has unquestioned control of the operating system market.

NT's legacy will evolve over the next two to three years, as developers ready distributed applications. User operating-platform options now include Windows NT, NetWare, OS/2, a unified Unix, and perhaps an advanced OS like Taligent. NT has a lead over an ununified Unix, and greater visibility than un-portable OS/2. It has newer technology than NetWare.

By any reckoning, Microsoft is in for a fight, particularly against Novell. After years of running in parallel indifference, they now face a future pitted against one another. Both are used to unquestioned dominance, and neither may be prepared for the contest. Microsoft has entered new territory with NT. Its marketing might will take it so far. The fact that most new PCs will run some version of Windows right out of the box is an advantage. But it is no longer just PCs that Microsoft is interested in running.

Gray Sheet Also Rans: Other Important IT Stories from 1993

Emergence of Hong Kong, Taiwan, and PRC: Growth in Greater China

AT&T Continues Aggressive Expansion

IT Companies Tap Management Consultants

Hard Times at the Highest End: Supercomputer and Parallel Woes

Notes Success Spurs a Comeback at Lotus

Apple in the Doldrums: Newton Down, Sculley Out

On paper Apple didn't have a bad enough 1993, and the departure of CEO Sculley is not news enough, to warrant mention in our top ten; on Wall Street it's a different story. At first glance it might appear that Apple's common stock is the first casualty of oversold and underdelivered digital media. The stock's price has fallen by over 50% in the past 12 months, coinciding with the release of the first Newton (to negative reviews), and a 30% unit growth in Macintosh sales.

In fact, the precipitous drop is probably due to a more fundamental metamorphosis in Apple's business policy and strategy than to the alleged failure of Newton. Apple faces a strategic change more rudimentary even than 1992's shift to emphasis on high-volume, low-margin sales. And more tangible and threatening than a shift to revenue streams based on futuristic digital services.

Apple's fortunes declined in 1993 because of threats to its core strengths and key competitive advantages. Over the next 12 months it will be forced to trade its viselike grip on Mac's prize-winning look and feel (that millions of users swear is the greatest thing since the desktop calculator) for a piece of what it hopes will be a bigger pie: PowerPC. In his address to Comdex in November, Apple CEO Spindler acknowledged that the company was seriously considering licensing its PowerPC OS. The challenges associated with competing head-to-head with the Microsoft side of the Intel/Microsoft duopoly are more responsible for Apple's decline than another two or three slow-selling digital media products.

To understand the depth of Wall Street's concerns, consider that Apple's Macintosh business actually had a very strong 1993. Worldwide unit sales increased by 30%. In the two largest IT markets, the United States and Japan, Apple's unit sales increased by 32% and an astounding 56%. It outgrew both markets and outsold Compaq by half a million PCs worldwide in 1993.

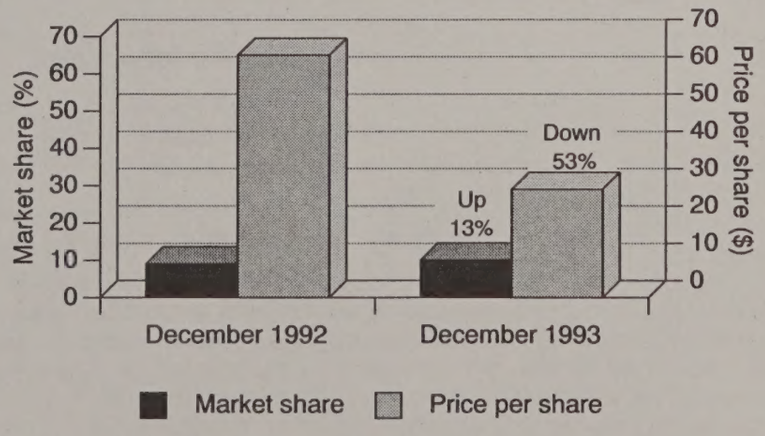
Further, only the truly naive might have felt that Newton's impact would resemble anything like the Mac's 1984 debut. For a year now the byword of the digital media age has been "communication," in the same way that "personal productivity" symbolized the Mac introduction. Unlike the Mac, communication takes more than a single product. Likewise, a single product will not make a new market. Infrastructure and services will. As more of these products and services come online, Newton might take off in real volume.

The transition to PowerPC is the real reason for Apple's Wall Street problem. Neither of the options are very enticing. On the one hand, Apple faces a very real threat of becoming just another PC company if Mac-enabled PowerPCs are shipped by IBM and other suppliers. Should it choose to license the software to others, it will no longer be able to compete simply by relying on the extraordinary Mac interface.

On the other hand, if it does not, Apple faces the unenviable task of maintaining its slim 10% of the worldwide PC market. New customers will become fewer. Fewer still will switch from Intel/Windows.

If Apple wants to remain a PC hardware company, the competition will come down to features, function, low cost manufacturing, time to market and designing the best form factors for different quasi-vertical niches. Since Apple hasn't needed to compete on these points to the degree *that it will need to in the PowerPC future,* Wall Street is concerned. Apple's 1994 fortunes will hinge upon how quickly Spindler makes the decision, and then how quickly he can instill confidence and competence in the new business model. Perhaps one reason for Sculley's departure was that he recognized the complexity of these challenges.

Apple's Worldwide PC Unit Market Share and Price per Share of Common Stock



Source: International Data Corporation, 1993

Bottoming Out at IBM: Gerstner's IBM Takes Shape

For IBM in 1993 no news was good news. This is hardly surprising from a company that made headlines by losing $7.8 billion during 1991 and 1992. That 1993 will likely see a return to profitability (or perhaps at least losses measured only in the millions) is better than good news, particularly since almost no one expected a technology-driven or product-driven turnaround so quickly.

It seems far longer than 11 months since the January 26, 1993, board meeting at which John Akers resigned. The end of the only unsuccessful tenure at the top job at the biggest company in the industry came slowly. In a similar way, IBM won't turn on a dime and achieve a full comeback for many months. Most notable about the brief Gerstner tenure are these highlights:

- The rush toward formal structural decentralization was quickly halted. A leaner IBM will remain largely intact in order to provide customers with something the competition cannot: top-to-bottom service, support, and products.
- An influx of non-computer executives (many from RJR — a tobacco, biscuit, and packaged-goods conglomerate) has given IBM's marketing operations a completely new look. But such an injection of such completely non-IT-experienced personnel is absolutely unprecedented, and very risky. Indeed, John Sculley is one of the few IT outsiders to rise to prominence in the business, and the sugar coating is quickly peeling off his legacy at Apple (see page 7). Gerstner is betting that selling brands is selling brands, no matter whether it's soap or PCs. This is a very risky bet.
- Gerstner declared that the last thing IBM needed was a CEO with a grand plan or technological vision. As funny as it sounds, when a company has as much technical know-how as IBM has (albeit hidden by stifling bureaucracy), he is right.
- Jim Cannavino's ascension to the Executive Committee brings much needed PC industry expertise to the helm.

Gerstner has chosen thoughtful tweaking when much of the industry was calling for rash action. The jury is still out. However, over time several fundamental problems in IBM's long-term bread and butter businesses need to be addressed. We note the following areas of concern and challenges:

- A high-end business model — IBMers throughout the Enterprise Systems Division have embraced a new strategy based on lower costs and lower margins. They are certainly talking about it more often. The business model should be adjusted to reflect the fact that high-end margins are found only in software.
- International operations — IBM has recently announced that another 10,000 European jobs will be cut. Whether mere cost cutting alone is sufficient to revitalize IBM's European operations remains to be seen, and indeed seems doubtful.
- Office of the president — No one has held this position at IBM since Jack Keuhler departed last year. That probably means much of the day-to-day operational detail has been assumed by individuals in smaller fiefdoms throughout IBM. The overall management services traditionally coordinated by the president may be, in the CEO's opinion, less important than operations at the business unit level. Balancing between empowering business units and centralized resources is a problem that won't go away quickly.

IBM's New Blood

Appointment	IBM Position	Previous Employer
David B. Kalis	VP Communications	RJR
G. Richard Thoman	Senior VP	RJR
Jerome York	CFO	Chrysler Corp.
Frederick W. Zuckerman	Treasurer	RJR

IBM CEO Louis Gerstner has appointed several non-IBMers to key executive positions since accepting his new position last spring. The appointments are indicative of a fundamental assumption: selling PCs and online services is similar to selling more consumer-oriented products. However, demand for consumer brands shows little of the cyclical fluctuations that demand for PC brands show. PC brands have to have the very hottest new technology, all the time, to even out that demand. One possibility for IBM: mimic HP. It has found a successful formula for listening to customers and remains the most impressively market-driven over-$10 billion company in the business (maybe the only one).

Hewlett-Packard: $20 Billion and Growing

Hewlett-Packard's emergence as the clear #2 U.S.-based computer company has resulted from a heads-down, no-nonsense approach to the business. This ascension is among the most unheralded success stories of the past year. In fact, when HP's PC revenue is combined with its printer and workstation business, HP is (at almost $9 billion) the second largest PC company in the world.

In the late 1980s, Hewlett-Packard and Digital stood as twin pillars of the midrange market, apparent survivors of the minicomputer shakeout. While Digital has suffered lackluster sales and uncertain direction, HP has emerged as a $20 billion diversified force with popular (printers) and timely (open-computing platforms) product lines. In 1993, HP saw its midrange business gather momentum as the company established the HP 9000 800 Series as a viable downsizing platform. The printer business met the challenge of competitors that closed the price/performance gap and has pushed towards the $5 billion level in 1993. Not long ago, it was considered remarkable that a printer business could grow to $1 billion.

HP has long been the king of laser printers. The success of its inkjet products has helped extend that dominance into lower-priced markets. In the laser market, HP is challenging rivals with lower prices and new features. Competition has stiffened, but HP is holding its ground, so far avoiding a repeat of IBM's PC-compatible experience. In the inkjet segment, HP wisely patented core technologies of its products, raising barriers to competitors attempting to create low-end "clones." The firm is expected to develop, and patent, future laser technologies as well. HP has also gotten serious about PCs, cutting manufacturing costs and adhering to the realities of the marketplace. As a result, its PC business has gained in stature and shipment levels.

Nowhere has HP's resurgence been more apparent than in the midrange market where the HP 9000 and an array of Unix-based software tools have ridden the waves of commercial Unix acceptance and mainframe migration. In 1993 HP's proprietary MPE-based 3000 family actually showed declining sales, while multiuser Unix rose about 30%. The company has found ready customers for its solutions in the financial services, manufacturing, and telecommunications industries. HP's success in the systems market is due to its customer-focused marketing and ISV efforts, unquestionably high levels of service and support, a diversified product line, and an effective balance (and transition) of its MPE-based systems and Unix business. To maintain momentum, the company must continue its price/performance leadership; tightly integrate its systems management software on Unix and LAN platforms; improve high-availability functionality on the 9000; and expand the migration of its lower-end systems through indirect channels.

Organizationally, HP has become more streamlined and efficient. Improvements in the company's PC business are largely attributable to lower manufacturing costs and shortened time-to-market. PCs and printers now use the same sales and distribution channels in an effort to compensate for the ever-lowering margins inherent in indirect channels. Continued growth will be determined by the company's responses to shrinking margins and the longer sales cycles (and increased cost of sales) associated with selling higher-level systems to larger customers.

Unix Databases Continue Strong Growth; Oracle Leads the Charge

The relational database market was one of the year's big success stories, growing by 28% to $1.4 billion in 1993. Combined, the major database suppliers grew by approximately 40%. That these companies are well positioned for future growth with leading-edge client/server technology is no surprise. That they're also making money doing it — the future is now — is significant.

The advanced operating environment RDBMS market consists of multiuser RDBMS server software on Unix, NetWare, OS/2, and Windows NT. These platforms are fast becoming essential components in many open systems and distributed information architectures due to their flexibility. Unix remained the largest portion of this market in 1993, still the operating environment for over 80% of AOE RDBMS server revenues. In the next few years, the platform contest among Unix, NetWare, OS/2, and Windows NT will intensify. Novell NetWare, currently the

number one contender, enjoyed its second consecutive year of robust activity, growing 85%.

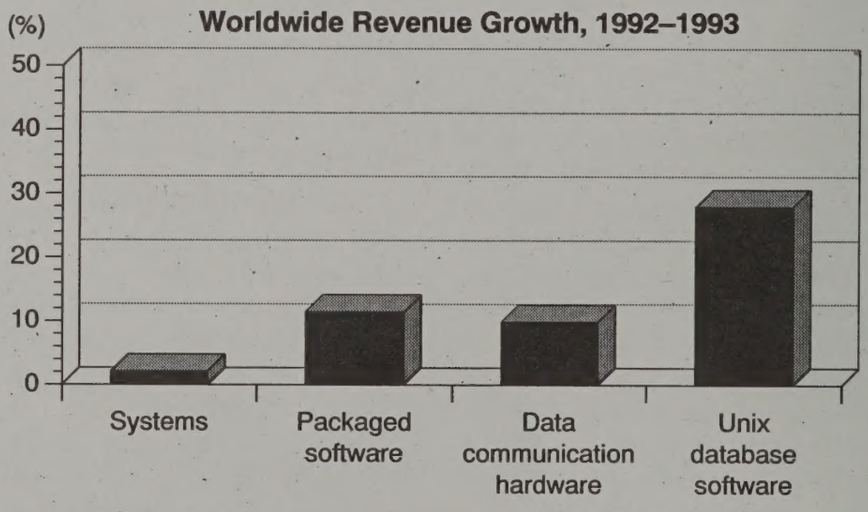
Oracle continues its hold on the Unix RDBMS market, maintaining or growing market share in all areas during 1993. The Oracle7 business on Unix grew 33%. It grew over 40% on non-Unix platforms, and the company is only now beginning to ship its OracleWare product family, which is expected to further accelerate this side of the company's business.

Oracle's strength is not just in database technology. The firm has diversified into a comprehensive $1.5 billion software supplier, boasting industry-specific applications, Oracle Office, support and training, and a dedicated consulting division. In January, the company will announce Media Server software products for large-scale multimedia. Oracle has also gotten serious about third-party distribution. In 1993, the company recruited 700 new partners, and its domestic reseller revenue share rose to 18%, aiming for a fiscal 1994 target of 30%. Its business remained solid in all of its major verticals — utilities, oil and gas, pharmaceuticals, retail, healthcare, financial services, the public sector — while telecommunications emerged as a new growth area.

In 1993, Sybase was once again the big market share winner in the Unix RDBMS market, gaining nearly two more points. Sybase's new System 10 products helped its server software business to grow 62%. Ingres and Unify struggled to keep up and have seen their market shares slip from 11.3% to 7.8% and 3.2% to 2.0%, respectively, since 1991. During 1993, there was less than anticipated impact by the mainframe database software suppliers as these suppliers got used to differences in the Unix market business and IBM delivered DB2/6000.

Low-end database server market leaders Gupta and Microsoft also fared well in 1993. Gupta's database revenues grew over 50%, and Microsoft weathered a shift in its SQL Server business from OS/2 to Windows NT, pushing the overall NT database business slightly higher than expected.

Unix Database Market Outperforms the Overall IT Market



Source: International Data Corporation, 1993

Suites: Taking PC Application Price Wars to a New Level

The introduction of software suite packages during 1993 by the major application suppliers has been significant: Microsoft's Office 4.0, Lotus's SmartSuite 2.1, and Borland's Office (QuattroPro and WordPerfect for Windows) made their debut. In IDC's October PC Software Pricing Survey, Word and Excel for Windows cost $295 apiece while the street price of Office 4.0 slid to $470. That's a compelling difference, even for the 55% of users who express frustration at the inflexibility of bundled software.

The increasing popularity (or sales anyway) of personal productivity suites raises several issues:

- Can suppliers with only one or two titles compete with suites across several segments and survive? With whom should they partner?
- Can suppliers survive in the near term on the lower margins of suites?
- What is the relationship between suite sales and upgrade revenue potential? More specifically, is it any different than for the sale of standalone applications?

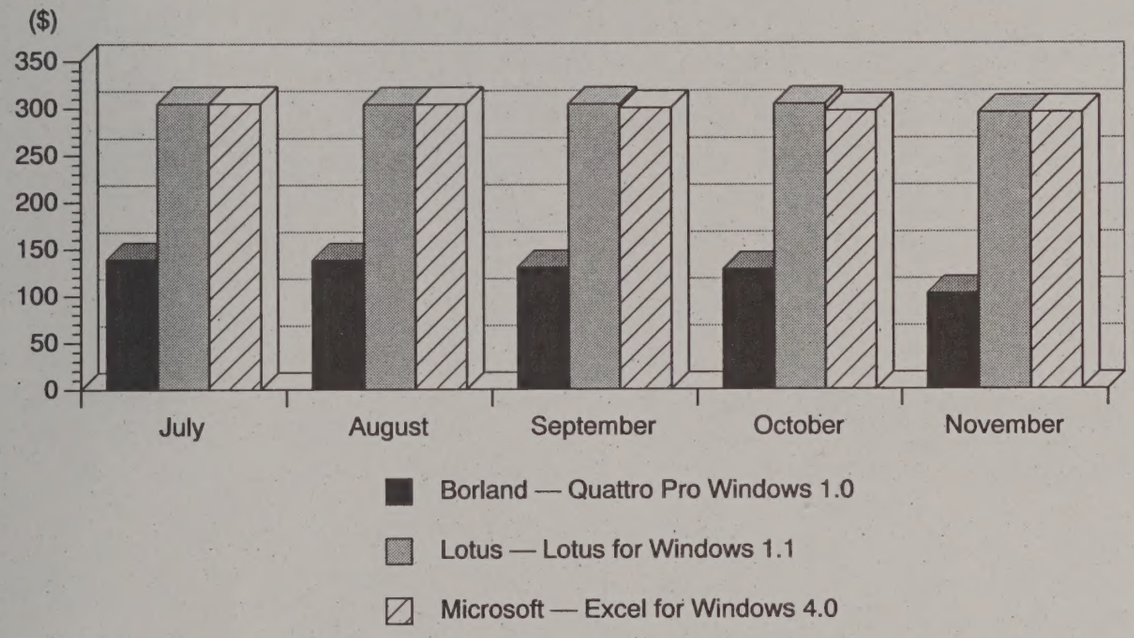
Software suites serve three main purposes: They are a broader, more functional, and, hopefully, more attractive solution for users. They give suppliers a competitive weapon in the battle to control users' desktops. They are also an attempt to stall the nar-

rowing of the gap between the marginal cost and street price of personal productivity applications by creating a new price point in consumers' minds.

In the near term, suite sales probably pose no real threat to individual suppliers' or thin industry's overall health. Most applications companies currently operate on relatively high margins. A decrease of another few points won't hurt too badly. In addition, suites provide significant potential to lock users into a product line. This has the double benefit of expanding unit sales, as well as offering significant upgrade potential.

In the long term, the shift toward software suite sales has more important implications. It may presage the introduction of highly focused suites that give specific users specific functions. For example, a statistical suite might include basic data manipulation and reporting packages as well as a graphics package and custom charting applications.

Pricing Pressure on Windows Speadsheet Market Leaders



Source: International Data Corporation, 1993

A Suite Timeline

1990–1991 *Stage 1*	Fall 1993 *Stage 2*	Mid-1994 *Stage 3*	Early 1995 *Stage 4*
Bundled shrink-wrapped applications	Enhanced 2.0 versions of products	Mix & match suites "The Analysis Pack" "The Administrative Pack"	Task-specific suites vs. standalone applications
	"Applets" offer first-stage integration	Enhanced integration — "seamless"	Macro languages integrate applications within & outside the "suite"
$750–795	$395–795	$500–695	$500 per unit

Source: International Data Corporation, 1993

Information Highways — Today and Tomorrow

No single event of the past year garnered more attention than the incipient construction of the information highway. During that same period no single industry product or service experienced more grassroots, raw demand than the Internet. The relationship between plans for the information highway and the runaway success of the Internet is critical to the future of the industry, and represents one of the most compelling stories of the year.

The sharing of information between people and devices has fueled the migration to a ubiquitous infrastructure that will soon encompass the domains of the television set, the telephone, and the data center, which will carry all of the information and ideas of our present century into the next — maybe. With all the media hoopla concerning this convergence it is easy to be swamped by a tidal wave of technological promise with little foundation in actual need. However, if one looks closely, currently the first dirt roads exist as well as two lanes upon which the information super highway will be modeled.

The success of the Internet has been profound. The total number of Internet users has been estimated at over 15 million, with 2 million new users added each month. The growth is due to several factors:

- The ability to share electronic databases, bulletin boards, and mail between diverse locations and processors.
- The diversity of users: research institutions, private citizens, and corporations can exchange data within a completely private, and for the most part, free, network architecture available anywhere within the world.
- Although throughput and response time are relatively slow, it is here now.

The overall success of the Internet has forced the existing online services like Compuserve and America Online to provide interfaces to the Internet. But is this the precursor to the information super highway?

The Internet has flourished like a wild vine with its access to resources and ubiquity. However, the past year has seen the battle for the information super highway launched in earnest. Vast sums of money have been invested in the mergers of Time/Warner with US West, the proposed acquisition of cable company TCI (Telecommunications Inc.) by Bell Atlantic, and the AT&T and McCaw Cellular deal. Each company is striving to garner a significant piece of the expected super-highway pie. Interactive television combined with the telephone to offer 500 channels of programming on demand promises to be very big business in the next five years.

The real question revolves around whether all this convergence excitement is based on customer demand or vendor-perceived business opportunity. Somewhere between $30 billion and $150 billion will be needed in the United States to build the entire information highway infrastructure. This scale of investment presents huge risks for a questionable overall return. If the interest in this type of service were currently as great as is expected, contrarians ask, wouldn't the pay-per-view business be much larger, the demand for videophones astronomic, and technology like ISDN fully deployed internationally?

The issue of who pays for the information super highway will be the most telling variable in the equation. Additionally, the requirement that the service match that of a common carrier, available to everyone at a fair price, may put increasing pressure on what services are available when — or risk ominous social issues.

For the time being, the Internet is here, now, providing much of the expected connectivity advantages of the next-generation super highway. Businesses and private customers can get the access to widely diverse resources at very low prices. The compelling reasons for the Internet's deployment were based on clear end-user demand. The information super highway may not have that luxury.

Indeed, the image of a bottom-up solution driven by demand, contrasted to a solution imposed on a skeptical public by one or more large institutions is familiar in this industry. Consider the legacy of ISDN. Since 1979 the Bell system has been blindly promoting it as the ultimate communication and connectivity solution. However, due to the lack of investment in infrastructure, lack of understanding of how to sell and market such a new service, and the absolute absence of applications and therefore customer demand, ISDN has only recently become viable. Meanwhile, look to the Internet.

Whether the promoters of the information highway concept will offer solutions as ultimately unwieldy as those offered by the early backers of ISDN remains to be seen. The lesson seems clear: people want high-function communication services inexpensively. Put another way, electronic malls or video on demand may not be the killer application.

THE GRAY SHEET
Computer Industry REPORT

DOUG McLEOD, EDITOR | January 14, 1994 | VOL. 29, NO. 5 | Published continuously since 1964.

Middle East IT Markets to Top $3 Billion in 1994

IDC's mission to further refine its quantitative model of the worldwide IT industry has taken it to the Middle East, where the IT industry totaled just under $3 billion in 1993. Approximately one-half of that comes from Saudi Arabia and Turkey. Over the next five years the entire Middle East IT market will at least double — and maybe triple — the worldwide market's 6.5% forecasted annual growth.

Much of the region's IT market has two common themes: Arabic cultures and economies based on oil. The predominance of a single language across the region creates economies of scale for IT suppliers and has spawned a strong and growing software localization industry. Oil exports fill Middle Eastern bank accounts with hard currency for financing large-scale modernization projects.

These influences might be expected to lead to a fairly homogeneous regional market — with a similar structure, usage pattern, and growth rate across several countries. They do not. Instead, the Middle East IT market is a mishmash of idiosyncrasies and indigenous country personalities. Diversity is the hallmark of the IT industry, which stretches in a broad triangle from Istanbul to Dubai to Casablanca. Consider the following:

- Turkey is the largest single market in the Middle East, yet it is somewhat of an outsider. It shares a Muslim tradition with its neighbors to the south, but considers itself a more European-style IT culture. Its hardware market is expanding rapidly, dominated by explosive PC growth: 1992's 100,000 unit shipments grew to 175,000 in 1993.
- Saudi Arabia has more to spend on IT than countries many times its size. Its largest users have over the past decade chosen to invest in mainframe-dominated architectures that simplify management and ease centralized control and coordination. The PC segment is slowly gaining attention and is dominated by brand names like AST, IBM, and Compaq.
- Enigmatic Egypt is the region's largest disappointment. Its 55 million inhabitants supported only a $66 million hardware industry (in 1992), which is mired in intense price competition. Much of the multiuser segment is supported by the large influx of U.S. aid,

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which IBM Egypt has wisely and expertly tapped. Inexpensive PCs dominate the low end of the market, characterized by screwdriver shops and pirated software.

- Kuwait is the world's only IT market to contract by 50% between 1990 and 1991, only to triple in the next 18 months. Following liberation, Kuwaiti users replaced nearly every single piece of computing hardware that was stolen or destroyed by the Iraqis, often without regard for its actual value or for potentially lower cost substitutes. This artificial market topped $100 million in the 18 months following liberation. Kuwait will support a $20 million hardware market this year despite a host of real and perceived barriers to modernization. Chief among them is a lack of consumer confidence created by the threat from the north.
- Dubai in the United Arab Emirates (UAE) is home to the most vibrant computer industry in the Middle East. Its GITEX trade show is fast becoming the region's most important place to be and to be seen. The UAE's willingness to foster international trade has made it the center of distribution activities for many international suppliers, including Microsoft, Sun, Compaq, and AST.
- Israel's strong IT industry tradition stands in contrast to many of its Arabic neighbors, which are developing an IT infrastructure far more slowly. The Israeli market is highly westernized and highly developed. As a result, IDC has chosen to focus its preliminary efforts on Middle East IT markets outside Israel (our analysis of the Israeli IT industry is being completed separately).

The net result in this patchwork of desert oil fields, ancient civilizations, and modern high-rises is a regional market that defies singular description. The peculiarities of individual country markets dominate the local IT industry in the Middle East.

In fact, it has been only recently that multinational companies in other business sectors have begun to view the Middle East as a single regional market. What's more, these are typically markets and products that require very little in the way of technological or educational infrastructure — most notably inexpensive consumer items like soft drinks and candy. For IT suppliers, that kind of single, solidified view of the Middle East might emerge in three to five years.

Not surprisingly, competition in the Middle East computer industry is also highly fragmented. Neither European-, American-, nor Asian-based hardware suppliers have established a firm upper hand in this region of the world. The lead goes to the United States, on the strengths of IBM, Compaq, AST, Digital, Hewlett-Packard, and NCR. Throughout the area the strength, prestige, political power, and reputation of local distributors is more important than international brand names or price/performance.

However, Acer is strong and growing stronger quickly. Clone PCs from Asia have grabbed a huge portion of some markets. From Europe, ICL is quite solid in Egypt, and Bull has made impressive investments in the region. SNI has a toehold in the low end of the midrange in Turkey.

IT Companies in the Middle East: All over the Map

How big was the market for IT products and services in the Middle East in 1993? One barrier to a meaningful analysis of IT in the Middle East is the question of organizational structure and geography. Every major IT company defines "Middle East" differently, and therefore allocates resources to countries differently.

Some define the region to include the Magreb states (Morocco,

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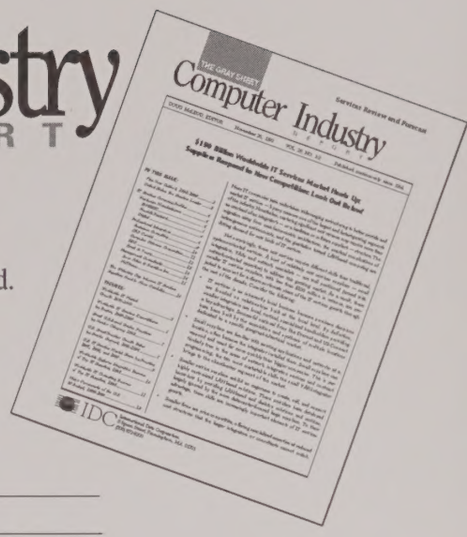

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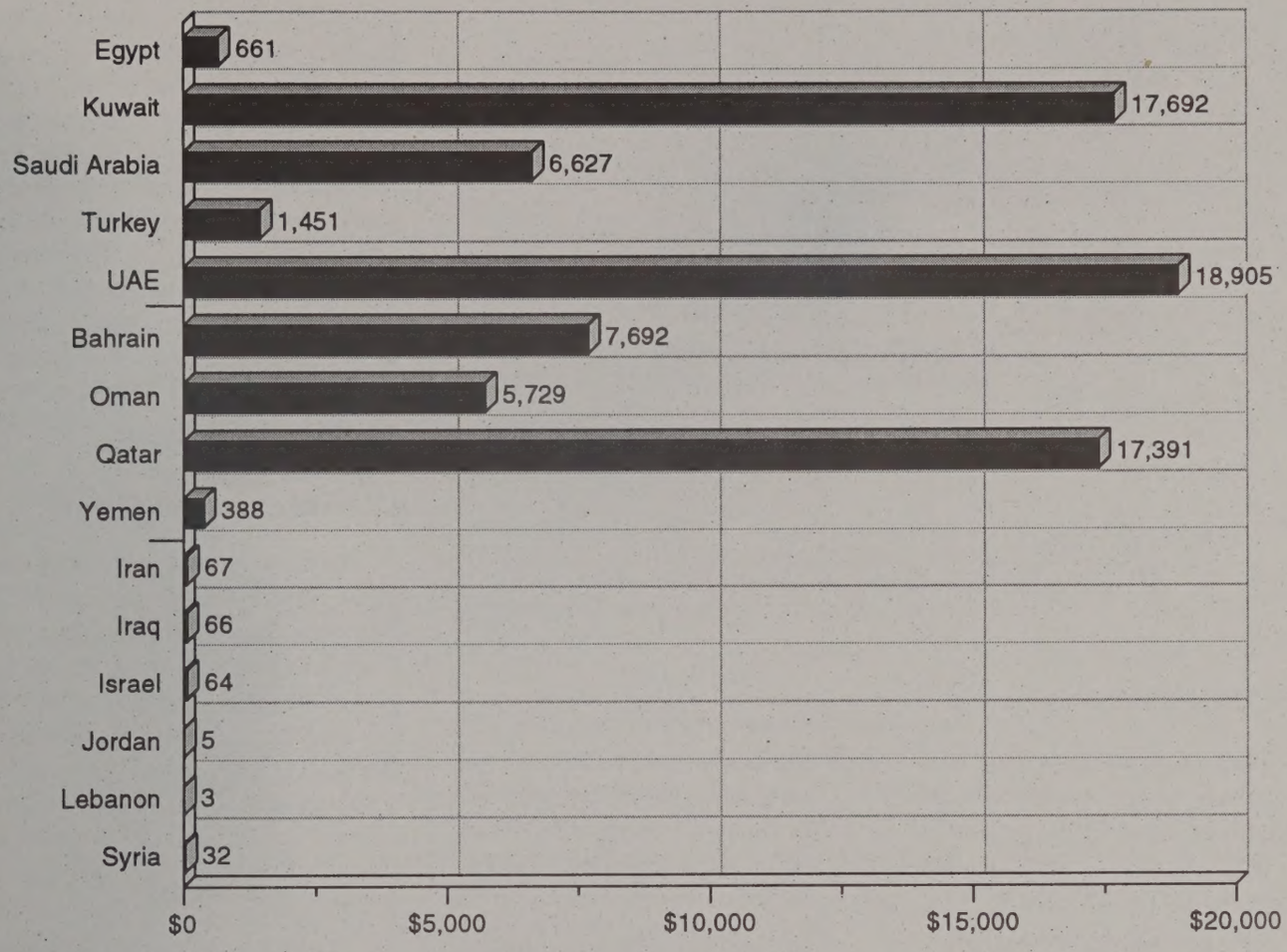
GDP per Capita in 15 Middle East Countries, 1992



Source: International Data Corporation, 1994

Algeria, and Tunisia) and portions of Africa because they share a Muslim tradition with countries to the east. Others include Iran and Pakistan but leave out Turkey. Some include Turkey but leave out Pakistan.

As a result, it is very difficult to compare the Middle East with other developing regions other than on a country-by-country basis. And it becomes difficult to compare and analyze the regional strategies of different IT suppliers.

In the broadest sense (that is, including all Arabic-speaking countries in the region, plus Israel, Turkey, Pakistan, Iran, and the Magreb) the entire regional IT market approaches $3 billion. Of that, approximately $2 billion is spent on hardware.

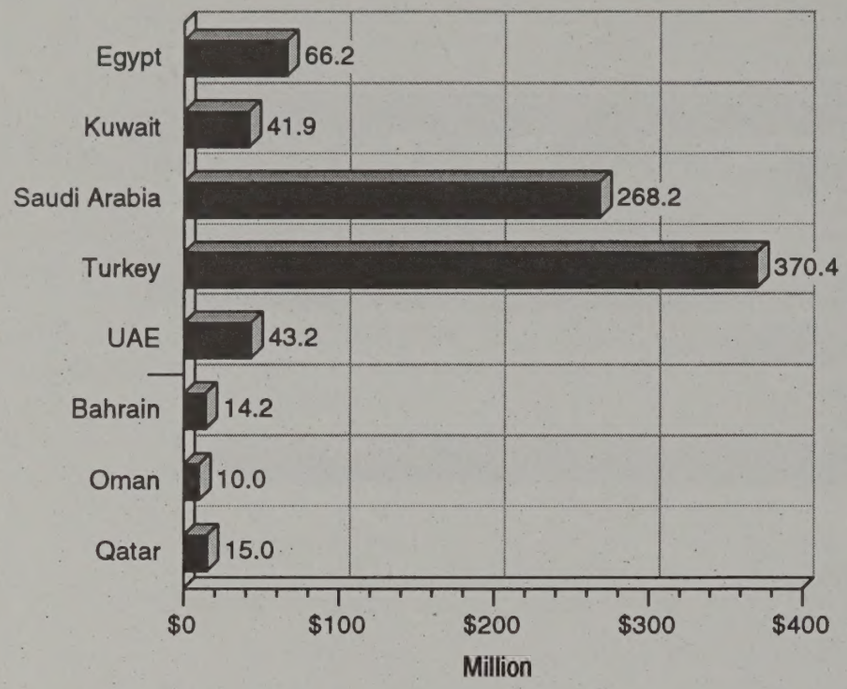
In order to gain a better understanding of each different component of that overall regional number, IDC has narrowed its focus. Our recent research in the Middle East examined five countries: Egypt, Kuwait, Saudi Arabia, Turkey, and the UAE. In addition, we have also collected data on three smaller countries: Bahrain, Oman, and Qatar. Consequently, when IDC refers to the Middle East or "the region," we are referring to these eight countries. When we refer to the "overall Middle East" we are referring to these eight, plus Cyprus, Iran, Iraq, Israel, Jordan, Lebanon, Libya, the Magreb states, the Sudan, and Syria.

Penetration and Growth Rates

The total IT market in IDC's eight Middle East countries reached $1.5 billion in 1993. Approximately two-thirds of that was spent on hardware. This proportion is in line with IDC's expectations for relatively young and growing IT markets. Of that $1 billion, approximately $810 million was spent on hardware in Egypt, Kuwait, Saudi Arabia, Turkey, and the UAE. We note these specific findings:

- The hardware market in these five countries grew by 10% in

Middle East Hardware Markets, 1992*



* Preliminary estimates

Source: International Data Corporation, 1994

1993 over 1992. It will continue to grow almost as quickly, at 9.8%, annually through 1997, led by 18% growth in the PC market.

- At $360 million in 1992, Turkey is the largest market in the Middle East, and it has perhaps the greatest potential of any Middle Eastern market. IDC estimates that over 100,000 PCs were shipped in Turkey in 1992. By 1997 the Turkish hardware market will total $680 million.
- Saudi Arabia is, at over $268 million, the second largest hardware market in the Middle East. With oil prices expected to remain level for another two years, hardware markets will keep pace with overall economic activity; software and services will grow more quickly.
- The Egyptian market totaled only $66 million in 1992. With 55 million citizens, a strong educational infrastructure, and the lion's share of the region's software industry, Egypt is well positioned for growth — assuming the Egyptian economy continues to grow.

In general, IDC's optimism about the Middle East mirrors that of other international economic forecasters such as the International Monetary Fund (IMF) and the World Bank. The IMF expects GNP growth in the Middle East to reach 4.6% in 1994.

This moderate growth figure is reflective of the lackluster projections for oil demand and prices over the next two years. When oil-dependent economies of the Gulf Cooperation Council are excluded from the figures, Mideast economic growth is forecast to average 6.5% annually from 1994 to 1998. This rate compares quite well with the 6.9% growth forecast for Asia over the same period of time.

This optimism is not spread evenly among the nine countries of the study. The largest real growth will occur in Turkey, which is benefiting from a decade of pro-Western government. Egypt will see very high growth rates (because it is a relatively small market now), and may explode if it can ever implement the reforms that have been discussed for years. On the other hand, the Saudi Arabian market will slowly wean itself off mainframes, and shipments of lower priced alternatives will grow.

Price-Sensitive Egypt: Potential Rests on Liberalization and Growth

Perhaps the single most notable aspect of the Egyptian IT market is the influence of the over $2 billion in aid that comes annually from the U.S. government. It is largely responsible for the strength of several U.S. vendors, most notably IBM, which has major and impressive contracts with dozens of government and quasi-governmental bodies.

Despite that influx of cash, the Egyptian IT market is a victim of the sluggish conditions that dominate the overall Egyptian economy. Specifically, the market is limited by the scarcity of two major resources: financial liquidity and skilled personnel. Both combine to restrain what might otherwise be strong growth in Egypt.

Egypt is one of the poorest Middle Eastern countries. Limited financial resources and government tender rules, which require that low bids win even if quality is inferior, mean that price is a dominant criterion for awarding business. Indeed, the entire Egyptian market is dominated by intense price competition. Hardware margins are dropping here as quickly as they are in more developed markets, and the market is struggling to sell higher margin software and services.

Additionally, the turnover of qualified IT professionals within both user and vendor organizations makes life difficult. Many local suppliers and users find themselves in a perpetual training bind. The IT boom in neighboring Arab oil countries and the high salaries offered there (five- to tenfold) continue to cause the emigration of skilled personnel from Egypt. The general feeling is that as soon as someone is trained and expected to start producing, the person leaves for some neighboring Arab country and that companies must continuously keep on training.

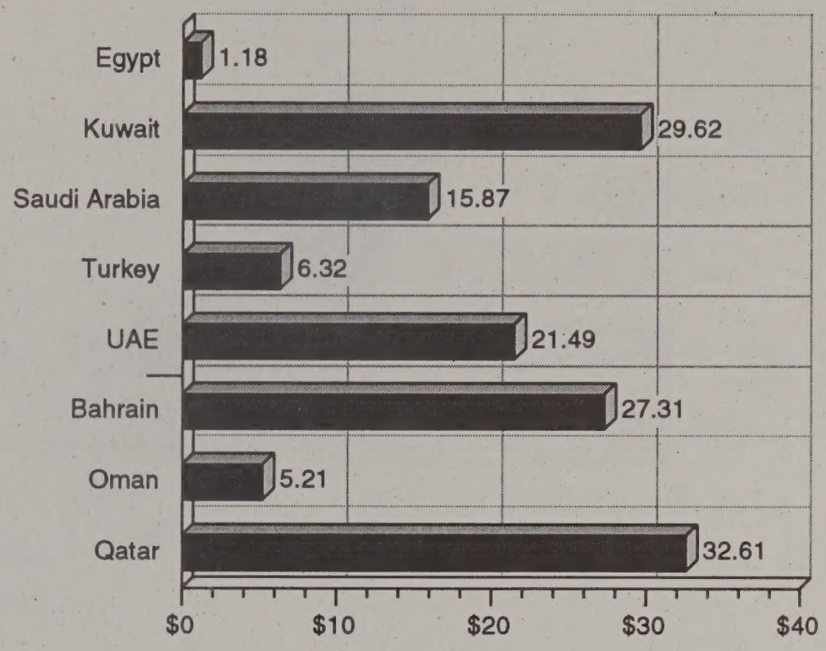
On the other hand, the U.S. aid forms an undeniably strong foundation from which to build. As much as 2–3% of the $2.3 billion is used annually to buy IT equipment — from U.S. companies. This situation has allowed American companies to establish operations in Egypt (for the sale of equipment to the Egyptian government) and then branch out into commercial sales.

In addition, labor is relatively inexpensive, even if it is mobile. For example, one reason so many software companies have located the Arabization centers in Egypt is the plentiful supply of inexpensive, talented programmers.

Kuwait: Labor Constrained Since Liberation

The good news in Kuwait is that since liberation the country has ordered and received approximately ten IBM mainframes. The bad news is that seven of them are still mothballed because their buyers cannot keep them busy. This kind of statistic illustrates the difficulty of rebuilding a destroyed technical infrastructure when technology changes so rapidly.

IT Hardware per Capita, Middle East and Selected Countries, 1992



Source: International Data Corporation, 1994

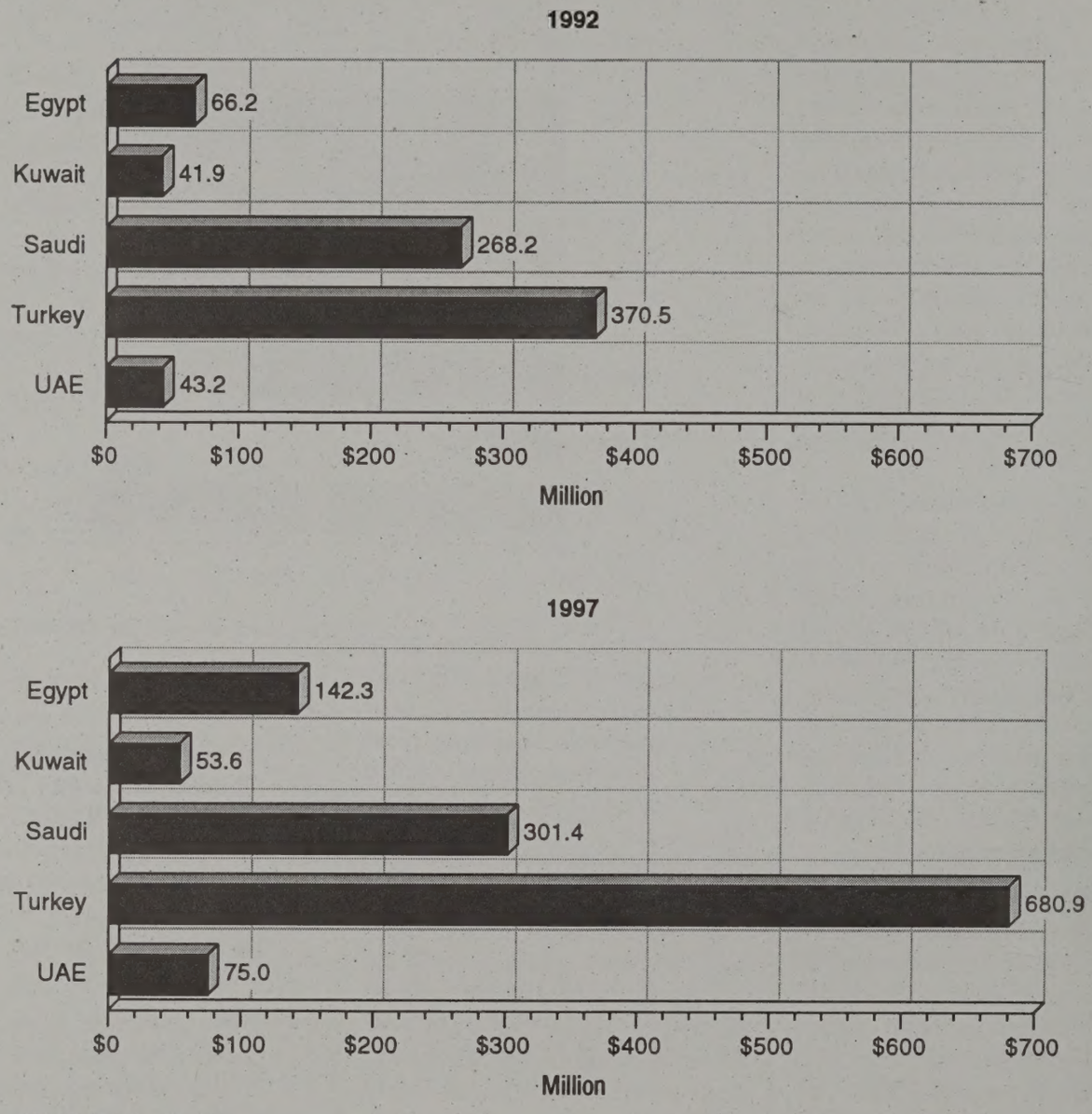
During 1992 and the first half of 1993, many major Kuwaiti buyers (most notably the government) rushed to replace systems that had been removed or destroyed by Iraqi soldiers. However, many IS professionals fled Kuwait during the war and have not returned, making the implementation of solutions very difficult. Also, the population of the entire country has decreased by one-third, rendering the mainframe-based solutions overkill. As a result, many of those systems are now collecting dust.

The postliberation replacement boom screeched to a halt halfway through 1993. Suppliers radically scaled back their plans and investments. Since then several factors have combined to depress spending on IT:

- The government has been unable to define a clear path for the Westernization of the economy. As a result, private-sector paranoia over further national stability and security have kept IT investment down.
- By government decree, guest workers in Kuwait are now limited to less than 50% of the country's overall population. Many IS shops that had relied extensively on expatriate labor are now having a hard time staffing up.
- The consumer market has never quite come back. Much of the better-educated and wealthier consumer class has left or purchases computers in Europe or the United States and carries them back to Kuwait.

Things are starting to turn around. The Kuwaiti computer industry is assuming a more stable, predictable performance. Many Kuwaitis have seen how organizations that had been computerized previous to the war have gotten up and running more quickly than others. The replacement boom bolstered the distribution channel, which is now taking a more active role in educating

Middle East Hardware Markets by Country, 1992 and 1997*



*Preliminary estimates

Source: International Data Corporation, 1994

consumers. The replacement labor that has returned (from the United States and Europe) has a better understanding of Western management styles and practices, which rely on IT.

Saudi Arabia: Strength at the Extremes

Tied to the fortunes of the oil-based economy and the policies of the Saudi government, the Saudi computer industry has seen wide fluctuations over the past 15 years. The economic boom of 1978 led to huge government and private expenditure on large capital projects. This investment led to the introduction of computer technology into virtually every sector of the Saudi economy.

Then, between 1984 and 1986, the erosion of world oil prices led to decreased government spending, and the IT market shrank. Thereafter, the IT industry has steadily grown. In 1992, the computer hardware market size is estimated at $268.2 million. It will grow by approximately 2.4% annually over the next five years.

The Saudi Arabian IT hardware market is dominated by two divergent forces. On one hand, the industry is maintained by a strong market for high-end, centralized processors. This market mirrors the society's overall predilection

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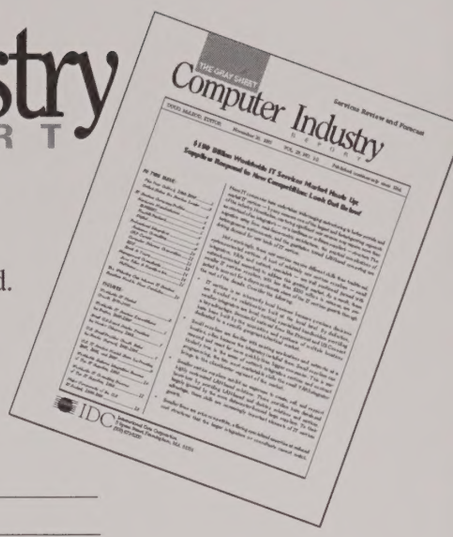

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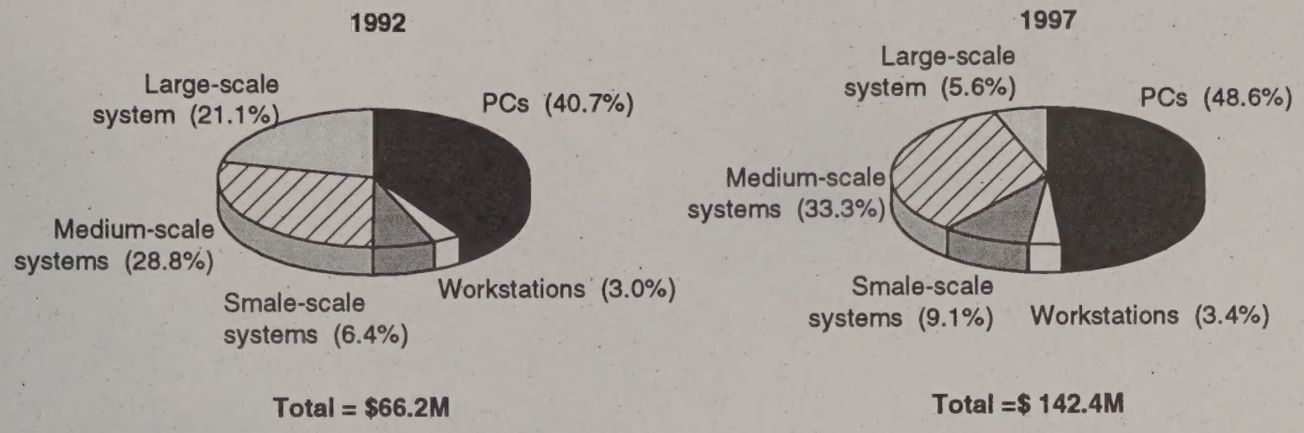
Egyptian Hardware Market, 1992 and 1997*



Total = $66.2M **Total =$ 142.4M**

*Preliminary estimates

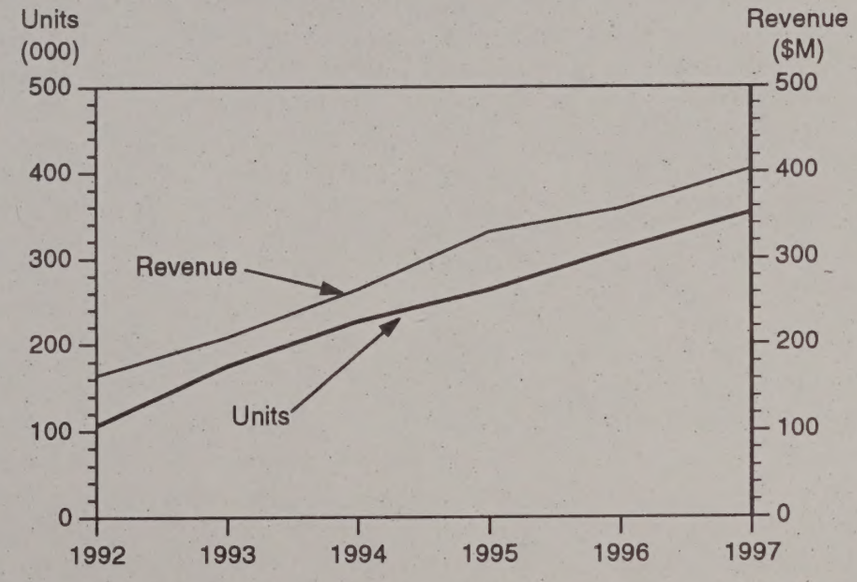
Source: International Data Corporation, 1994

toward centralized control and high security; Saudi users are only beginning to think about moving away from those very predictable platforms toward distributed and downsized solutions.

On the other hand, Saudi users are very interested in installing and using the very best technology, and unlike many users, can afford to purchase it. Increasingly, this means distributed databases, client/server architectures, and high-end PCs. As a result, the Saudi market is in a state of flux. Among our specific findings:

- The Saudi Arabia hardware market in 1992 is estimated at $269 million. This includes shipments of 253 multiuser systems valued at $185.4 million and 53,000 PCs with a value of $83.4 million.
- IDC estimates the hardware market to be growing at an average rate (CAGR) of 2.4%. It will total approximately $300 million by 1997. The low growth is due to the rapidly shrinking mainframe market, which is declining by approximately 15% annually. The PC market, on the other hand, is increasing by 12% annually.

Turkish PC Market, 1992–1997



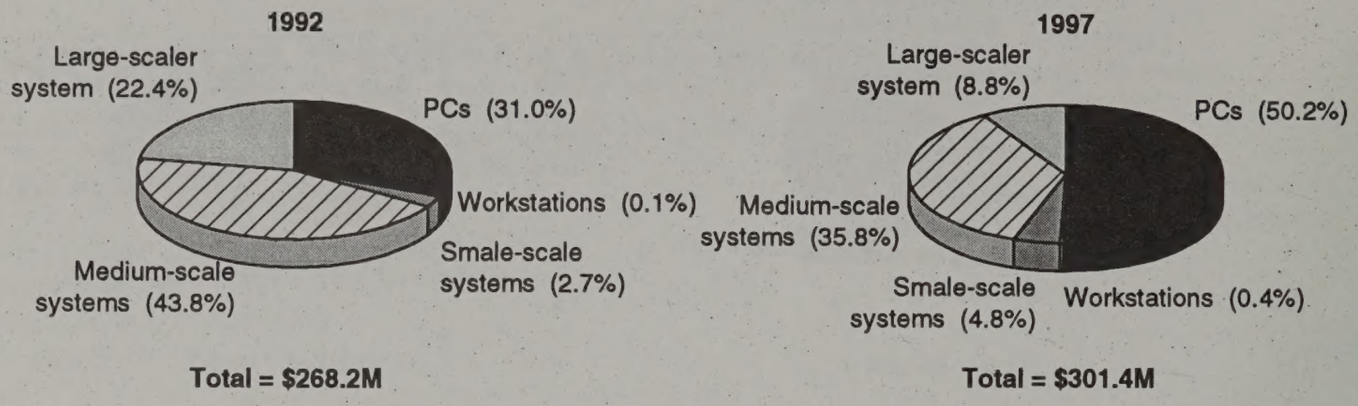
Source: International Data Corporation, 1994

Turkey: PCs Lead Strong Rebound

Turkey has the strongest IT industry of any country in IDC's study. A decade of political reforms, robust government spending, and strong financial and manufacturing bases created a total IT market in 1992 of approximately $600 million. The hardware portion of that was $368 million.

The Turkish hardware market stands apart from other countries in the Middle East by virtue of the strength and uniqueness of the local PC industry. The consumer and low-end clone markets are served by hundreds of local dealers and distributors. The PC market saw strong growth in 1992

Saudi Arabia Hardware Market, 1992 and 1997*



* Preliminary estimates

Source: International Data Corporation, 1994

(over 103,000 units, up 21% from 1991). IDC expects growth was even stronger in 1993, and we estimate shipments to total 175,000 units. Because of price cutting, revenue will grow somewhat more slowly, "only" 26%.

The Turkish market has not always seen such explosive growth. In fact, it actually contracted during 1992 from 1991 levels. Hardware sales in 1991 reached $370 million, and 107,197 systems were installed. The hardware market's decline was the result of a drop in multiuser systems sales. The multiuser systems market declined by 16.4% between 1991 and 1992. Revenue totaled $220 million.

In 1992 the slowdown continued at the high end of the market. Sales of large-scale systems dropped by 45% as a result of a slowdown in the public procurement. Medium- and small-scale systems sales are also sensitive to public procurement policies; however, these markets grew in 1992, though less than in 1991. The small-scale systems market grew by 11%. The medium-scale systems market was the healthiest multiuser systems market with a growth rate of 15.6%.

But the real story in Turkey is the strength of the PC industry. Locally assembled products were successful because they were able to address the price sensitivity of the Turkish market. Whereas the main customers of large- and medium-scale systems are public institutions and major accounts, PCs are widely used in a variety of offices and workplaces as a consequence of a general computerization.

Suppliers' competitive price policies had a positive influence on PC sales in 1992. This trend is expected to continue in the coming years. By 1997 IDC expects the Turkish PC market to reach 350,000 units and $400 million in revenue.

As a result, the Turkish hardware market is expected to continue its strong overall growth. Increased public-sector demand that has only been partially met in 1992 will drive multiuser systems sales. Increased price/performance of all classes of hardware will also have a positive impact.

Software Review and Forecast

THE GRAY SHEET

Computer Industry REPORT

DOUG McLEOD, EDITOR | February 11, 1994 | VOL. 29, NO. 6–7 | Published continuously since 1964.

Object Alternatives May Lead to First Real Challenge to Microsoft's Ten-Year Industry Dominance

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The software industry, among the most complex and fastest-growing sectors of the worldwide economy, is on the cusp of another period of rapid transition. Competition in desktop operating systems, network/server operating systems, and applications will be driven by a new and perhaps revolutionary technology. The objects showdown will largely determine the future look of the industry.

The vague, industrywide, anti-Microsoft sentiment that has grown over the past several years is solidifying into viable alternatives. These include products shipping today (Unix), an object-based operating system (Taligent), and long-term object strategies (the OMG's CORBA specification — see page 4). Microsoft's dominance of the worldwide software market is under greater attack than ever before, even though its one-to three-year outlook is solid.

Of perhaps even greater interest, however, is the strange bedfellows these developments produce and the pressure they apply to traditional industry loyalties. Former (and current) foes IBM, Apple, and Hewlett-Packard are teaming up aggressively on Taligent. Novell is selling a desktop OS, Microsoft a network OS. Previously aloof Sun is selling the Novell-led Unix and has invested in NeXT.

The alliance of former foes has changed from uneasy agreements to marriages born of necessity. The key question: Will the former competitors bury the hatchet? Consider the following:

- HP's endorsement of Taligent is a visible clue to the future structure of the industry and brings the non-Microsoft object community to a quorum around CORBA. Taligent is aimed directly at Microsoft. As previously noted (see the *Gray Sheet*, p. 6, October 15, 1993), it may take a monopoly to break a monopoly. These three influential companies make for a good place to start.
- The three big hardware companies, Digital, HP, and IBM each have their own CORBA-compliant object-technology plans and frameworks. None has yet drawn the attention that Microsoft and its OLE has attracted. These three companies, as well as other smaller object providers, may soon feel enough pressure to propose a more cohe-

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sive challenge or will continue with their own efforts to develop compatibility to OLE. The likely vehicle: Component Interoperation Laboratories' OpenDoc.

- Competition on the server between Novell's Unix and Microsoft's NT is heating up. Unix has the upper hand, but NT is hanging tough after a cautious first year. One key issue: to what degree will Sun, the hands-down leading Unix hardware company, and Novell be able to cooperate? So far, Sun's endorsement of Novell's proposed unification strategy (centering around the Common Open Software Environment — COSE) has been less than enthusiastic. That will probably change as NT regains momentum.
- Microsoft got to where it is today in no small part because of the symbiotic relationship it has with Intel (and hundreds of PC companies). However, the sentiments of Intel and the PC companies remain a question mark. Clonemakers' support for the PowerPC architecture represents a greater threat to Microsoft than just Apple or IBM alone.

Whether these coalitions mount a serious and competitive challenge to Microsoft's preeminence is debatable. That challenge is a function of more than just high-quality software technology. It involves the creation of a stable, predictable environment for software development. Whether they like it or not, many users feel comfortable with Microsoft, and it seems likely that Microsoft's customers will remain very loyal. Until Microsoft does something very wrong, they have no compelling reason to look elsewhere for system software.

The gradual replacement of Microsoft at the pinnacle of the OS market may not be out of the question, however. The focus is on Taligent. It may emerge as a real problem for Microsoft, which may feel strong pressure to sustain growth and squeeze more profits from the near-monopoly OS business. Such profits can prove addictive and could drive up the cost of the overall Microsoft environment. A strong new product based on a new technology such as objects could lead to a major OS migration.

But it won't happen very quickly. Taligent is still one year away. It is being developed by one company for three independent owners. Nothing delays software development as does lack of focus and too many "strategic directions." In addition, the glue holding Microsoft's competitors together may not be very strong. The strategic underpinnings of many computer and software companies are more suspect than ever. With technology, margins, solutions, and organizational structures changing so rapidly, commitment to bold new directions may waver.

There is another software industry dynamic in transition: distributed software frameworks. Software technology appears to be splitting into two camps. One is concerned with providing distributed applications today, the other with laying the architectural groundwork for future applications.

The first focuses on delivery of products that are built around a specific set of established and reasonably mature products from a single vendor. Interoperability with other applications and products can be performed, but the facilitator is typically gateways and not higher-level interfaces. Companies applying this strategy include Oracle (Oracle7 plus), Sybase (System 10), Gupta (SQLBase/SQLWindows, (NeXT (NeXTstep/PDO), IBM (DB2/CICS for Unix), Lotus (Notes), and Microsoft (VBasic/SQLServer).

Conversely, the second camp is more visionary, concentrating on the development of high-level integration architectures that provide higher-level interfaces to utilize multiple lower-level software services. The services used could be bundled with the higher-level product, or be a separate, inde-

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pendent product (e.g., a relational database). The key is that the higher-level interfaces in the architecture provide an abstraction from all lower-level software products integrated into the environment. Leading proponents of this approach include SunSoft (DOE), HP (DOMF/Taligent), Novell (AppWare), Unix TP vendors (Tuxedo), IBM (Taligent), and Microsoft (WOSA).

IBM and Microsoft are found in both categories. Each is attempting to move forward with higher-level software architectures to reach product abstraction. But because neither can currently ship this type of product, both offer product-centric approaches. Eventually, the success of both these suppliers, and others, in distributed computing environments will be dependent upon their ability to effectively move to their respective higher-level architectures.

Partnerships will become common between players in both camps. Already one finds Gupta and Lotus teamed up; IBM, Apple, and Hewlett-Packard form Taligent; Sun/NeXT, Novell/Oracle, and Novell/Gupta are also partners. It is possible we will see Lotus/Novell, Oracle/Lotus, and even Lotus/AT&T.

The industry could end up with two or three major companies, such as Novell, playing in multiple partnerships. The company left out will be Microsoft.

The future shape of the industry will hinge on how Microsoft and its competitors utilize object technology in the development of future software architectures and products. As Microsoft ventures from the safe confines of desktop computing, the company — for the first time really — looks vulnerable. Lacking a real, formidable competitor in its core business for almost all of its celebrated existence, Microsoft is in for the fight of its life.

In this issue, the *Gray Sheet* discusses some of the concerns in the emerging object-technology business, including barriers to adoption and a review of ongoing standards efforts. This is followed by a review of the 1992 and 1993 results in the worldwide packaged software industry. It examines near-term competition in two important software markets: client operating systems and server operating systems. It examines the implications of the object technologies paradigm shift and reviews the challenges inherent in building client/server applications.

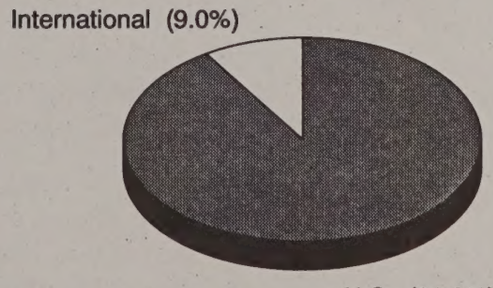
Object Technologies: Waiting for MIS

Most of the current demand for object technology is centered in technical applications; e.g., CAD/CAM and workgroup applications like office automation. The dominant users are ISVs themselves, and they have chosen C++ as a language, primarily because they were already programming in C. The second group of consumers is the advanced technology groups in large corporations. These organizations are large enough to reap the object-technology benefits that can come from multiple projects. They can afford the cost of acquiring and evaluating the OO products currently on the market. They also tend to have professional programmers with skill mixes similar to ISVs.

Generally speaking, the markets for analysis and design tools and that for object databases follow the object-oriented programming market. That is, interest in and activities with object-oriented programming generate an associated demand for products in the other two segments. They are higher on the object-technology food chain.

All of these markets and the associated products are still immature. Thus, a primary factor retarding the growth of this market is the immaturity of the methodologies and the limited feature sets of the corresponding tools. Many organizations, especially the conservative MIS community, are watching the market activity, trying to judge when to risk resources on evaluation of what they per-

Worldwide Object-Technology Tool-Market Revenue by Market Segment



Total = $351.7M

Source: International Data Corporation, 1993

ceive to be rapidly changing methods and products.

It is the broader market of commercial end-user organizations, the MIS community, that holds the key to growth of the object-technology market. Indications are that these organizations are interested, but cautious. This past year's increase reflects heightened user interest as well as a strong demand for Windows 3.1 and graphical user interfaces in general. IDC's annual IT spending survey shows that more than half (54%) of the sites surveyed engaged in significant or exploratory object-oriented programming activities during 1993.

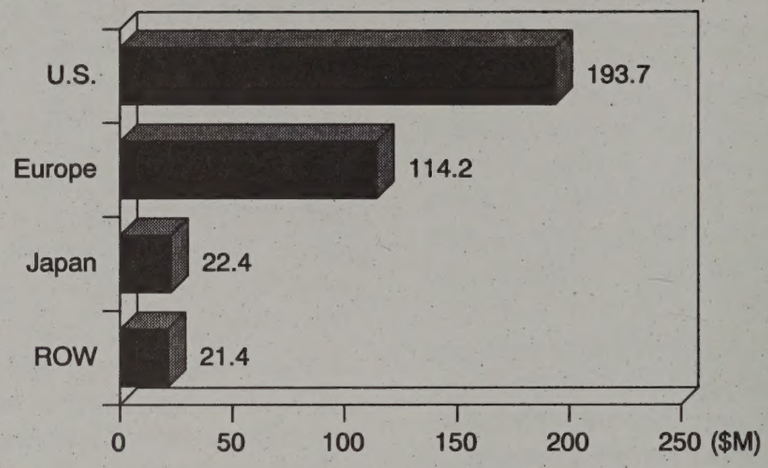
In order to address this interest and assuage some of the perceived risk that is an inhibitor to market growth, object technology will take on more palatable forms. The MIS community will not be asked to leap into C++. What will draw them instead will be development environments that work at a higher level of abstraction: either CASE tools, 4GLs, or visual programming environments built on top of languages like SmallTalk.

With these will come sets of reusable components in several forms (e.g., parts libraries, class libraries, and frameworks). The advent of object-oriented operating systems from Taligent and Microsoft will reinforce this trend. Progress by the Object Management Group with its proto-standards for distributed object processing will also accelerate market growth. Ultimately, it will be the realization that the benefits promised by object technologies are real and measurable that will strengthen the momentum of this market.

Competition for Object-Technology Standards Heats Up

Two areas where several proposed standards for object technology are competing for preeminence — distributed object technology and object-oriented programming — are emerging as important blueprints for the next generation of software competition.

Worldwide Object-Technology Tool-Market Revenue by Geographic Region



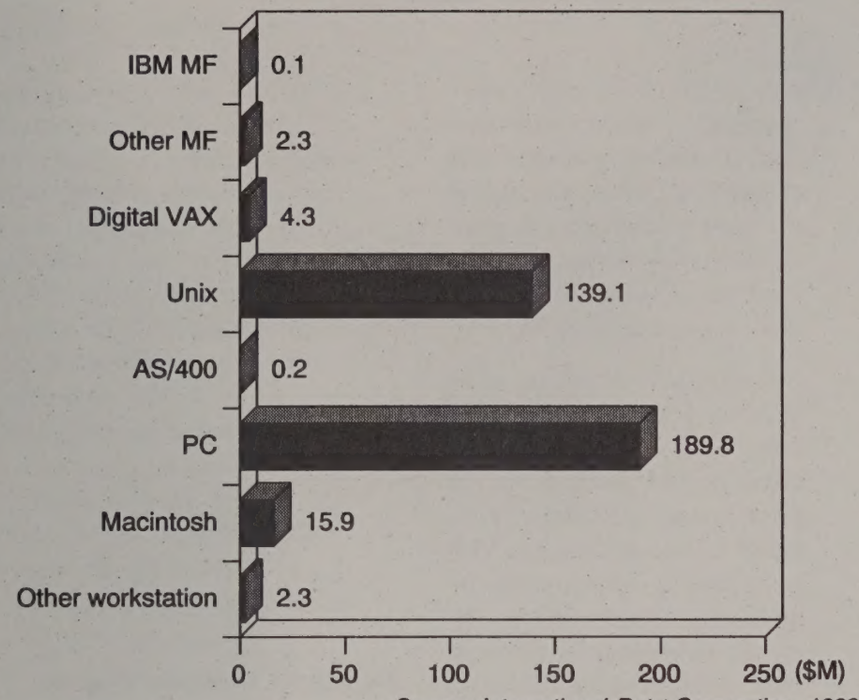
Source: International Data Corporation, 1993

Standards with a broad base of support are important if object-based programs and programming methods are to achieve breakthrough leaps in functionality, which have been rumored. The standards effort has one big problem — Microsoft. The company has its own strategy for implementing object technology into its operating environments and for facilitating the interoperability of object technology across heterogeneous networks and environments. Current activity in the distributed-object arena portends a couple of baffling years of Microsoft vs. the rest of the industry.

Abject Confusion: A Review of Object Acronyms

- **OMG — Object Management Group.** The OMG is a broad-based industry group promoting object standards; almost all hardware and software companies are members of OMG. The OMG is responsible for developing the CORBA specification.
- **CORBA — Common Object Request Broker Architecture.** CORBA is a standard developed by the OMG that defines how low-level objects interoperate. So far, competing CORBA-compliant models are available from the major systems vendors of the OMG. IBM has developed its Systems Object Model (SOM) and Distributed Systems Object Model (DSOM); Hewlett-Packard has its DOMF; Sun has Distributed Objects Everywhere (DOE); and Digital pushes its ObjectBroker. CORBA does not yet work across heterogeneous networks (its next iteration is expected to do so). This has enabled Microsoft to promote an alternative that is not CORBA compliant. Eventually, vendors' CORBA-compliant models are expected to be compatible with Microsoft.
- **OLE — Object Linking and Embedding.** Microsoft's OLE 2.0 is a standard for how compound documents interoperate. The central technology of OLE 2.0 is the

Worldwide Object-Technology Tool-Market Revenue by Operating Environment



Source: International Data Corporation, 1993

Common Object Model. COM is really an enabling technology that assists in creating a framework for compound documents and distributed objects. Over the next year, the importance of COM to OLE will be evident as Microsoft delivers the follow-on versions of Windows NT, Cairo, and Chicago, which promise to support internetwork compound document creation. Cairo/Chicago will be embellished with a variety of directory services, security, and messaging technology to further distributed object computing. OLE, then, is critical to Microsoft's goal of dominating not only the desktop, but network operating systems and even midrange environments.

- **CIL — Component Interoperation Laboratories.** CIL comprises a group of companies that are attempting to provide alternatives to Microsoft's OLE and offset Microsoft's marketing clout. Spearheaded by IBM and Apple, CIL is developing a compound document architecture specification called OpenDoc. Other backers of CIL include Hewlett-Packard, Novell, Taligent, WordPerfect, Oracle, and Xerox. OpenDoc has yet to ship, but it is intended to have several advantages over OLE. Most notably, it will run on several platforms from the beginning. Early versions of OpenDoc are now being demonstrated and tested. OpenDoc's primary challenge may be its late start; Microsoft has already distributed OLE 2.0 code to developers. OpenDoc is being designed to interoperate with OLE 2.0.

What Makes a Standard?

Microsoft does not support CORBA. The closest it has come is its agreement with Digital to support COM on Digital's operating systems, allowing COM to be readily available on non-Windows environments. Digital also supports Windows NT for Alpha and needs to support COM to ensure interoperability among its own platforms. Other licensing agreements are expected during 1994. Digital's commitment to establishing a bridge between its ObjectBroker and Microsoft's object model via COM has broken the ice for other CORBA-compliant vendors to follow suit. It is likely that Microsoft is moving toward interoperability with CORBA object models.

The companies involved with the OMG have their own CORBA-compliant object-based compound document technologies to promote. IBM may be the only other company with the clout to challenge Microsoft's OLE on its own, and it has CORBA compliance in its corner. IBM's SOM and DSOM will be part of Taligent, and SOM is integral to the future of OS/2 and the OpenDOC standard. HP's minority stake in Taligent and the merging of its DOMF with the operating environment only strengthens IBM/Taligent's position. The battle for distributed object technology just may come down to Microsoft vs. Taligent.

Microsoft appears to have an advantage in that it has a product and is promoting it in the right circles — developers and users. The standards groups, and the technology spinoffs from those efforts — SOM, OpenDoc, CIL — must play catchup. Microsoft's advantage is that it circumvents the cumbersome, time-consuming standards process by carrying out its own strategy. Microsoft may be able to win at the desktop, but its success beyond that arena is less certain. Taligent, and perhaps Sun/NeXT, will seriously challenge for the distributed segment.

The Worldwide Packaged Software Market: Balancing Maturity and Vitality

The worldwide packaged software industry has held up fairly well during the enduring worldwide economic softness. But overall, software industry performance registers only modest success when compared to years past. Software has fallen victim to the converging dynamics of less-expensive platforms and tighter user budgets.

Price wars, particularly in the PC software segment, continue to strain margins. The rise of lower-cost, lower-margin software has cut into mainframe and midrange company revenues and hastened the adoption of liberalized licensing policies and offshore development. For the remainder of the decade, the packaged software market will be characterized by moderate growth punctuated by surges in isolated, and highly publicized, segments. Consider the following:

- The days of 20+% growth across the software industry are over. Extraordinary performance is now the exception and is found in a few relatively new or technology-specific smaller segments such as Unix databases, CASE, or object-oriented technologies. The software industry as a whole is maturing, with heavy penetration rates of first-generation systems and software worldwide.
- Software is becoming a replacement business, with greater price pressure from stiffer competition resulting in lower margins. Also, as technology becomes more complex, technology cycles tend to spread out and become unsynchronized. Because of this trend, the whole market is no longer at the same technology level. Therefore, introductions of new technologies such as object- oriented databases will not have as pronounced an effect as the first wave of PC software had in a climate where there was no alternative.
- PC-oriented vendors have steadily claimed more and more of the software pie, predictably benefiting from the prominence of PC and LAN-based hardware systems. This trend should continue until the mainframe- and midrange- oriented vendors stem the tide with volume shipments of distributed or client/server offerings.
- IBM is the only company with packaged software revenues greater than Microsoft, with $9.96 billion, constituting 13.9% of the worldwide market. However, IBM's 1993 software revenues fell 10.3%.
- Among ISVs, PC software companies command most of the top positions. Microsoft remains the world's largest software company with 1993 software revenues of $3.6 billion, but still claiming just 5.0% of the $71.7 billion worldwide packaged market. Computer Associates, with its mix of mainframe, midrange, and PC software, is second with 2.6% of the market. The next group consists of PC-based and distributed-software firms Oracle (1.9%), Novell (1.5%), Lotus (1.3%), WordPerfect (0.8%), and Borland (0.6%).
- Hardware manufacturers, which once dominated the packaged software market with captive markets and proprietary architectures, find themselves sliding below the ISVs. Among other hardware manufacturers, Hewlett-Packard's software revenues were $1.01 billion, Digital's were $952 million, and Unisys's were $655 million in 1993. The only hardware firms to significantly grow software revenues in 1993 were Hewlett-Packard (28%) and Sun Microsystems (17%) both on the strength of their Unix-based products.

Packaged Software Market Overview

IDC divides the packaged software market into three broad and distinct categories: application tools, application solutions, and system-level software. Application tools, or tools, are defined as software used to generate applications to retrieve, organize, manage, and manipulate data. Application solutions, or solutions, are designed to solve specific problems inherent across all industries or in a particular industry or business function. System-level software is designed to operate hardware through basic operating systems and network operating systems; it also includes the myriad management tools that coordinate diverse functions such as the configuration of physical resources, system and network performance, or data-center resources.

- The worldwide **packaged software** market is estimated to have grown 11.1% in 1993 to $71.7 billion. By 1997, the market is expected to reach $116 billion with a CAGR of

Worldwide Packaged Software Revenues by Vendor, 1988–1993 ($M)

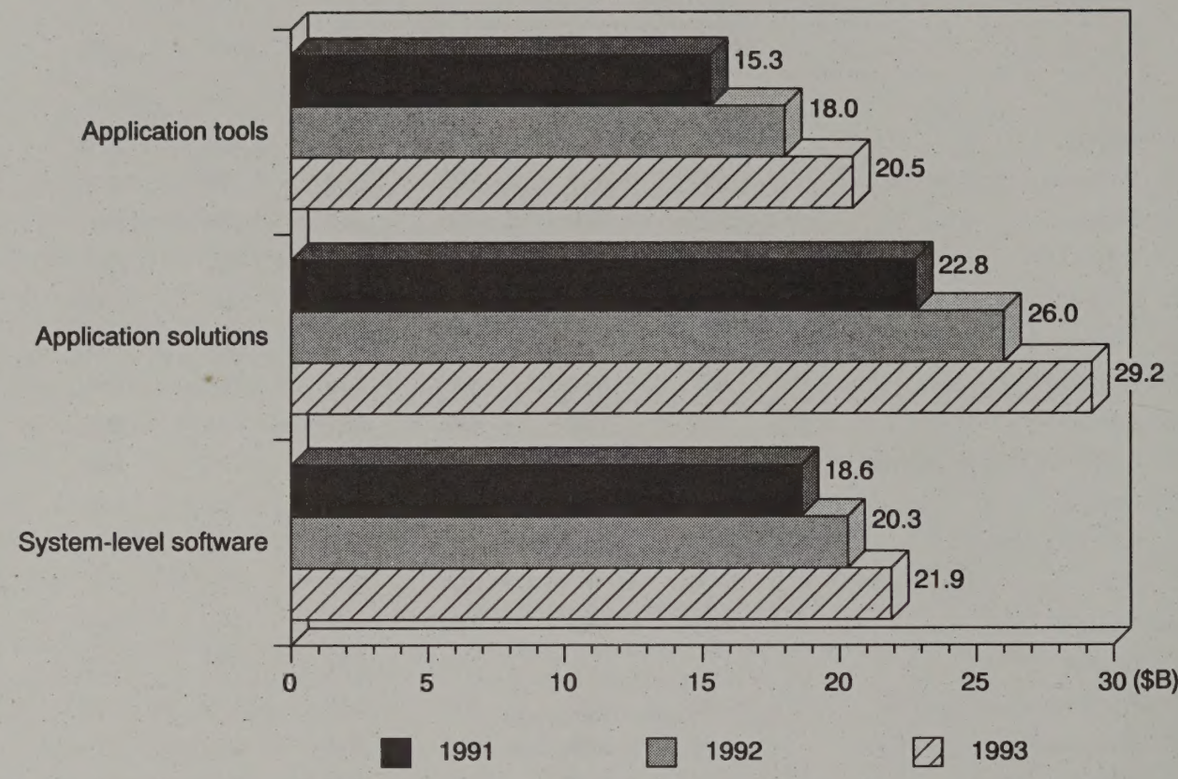
1993 Rank	Vendor	1988	1989	1990	1991	1992	1993
1	IBM	7,927	8,424	9,952	10,524	11,103	9,963
2	Microsoft	635	829	1,252	2,019	2,830	3,575
3	Computer Associates	1,305	1,484	1,526	1,589	1,590	1,845
4	Oracle	350	668	778	800	1,058	1,392
5	Novell	–	–	456	640	889	1,064
6	Hewlett-Packard	500	550	600	702	794	1,014
7	Digital Equipment	750	850	940	967	988	952
8	Lotus	437	534	547	716	796	846
9	Sun	110	150	425	531	590	692
10	AT&T Computer Systems	349	408	575	623	676	684
11	Unisys	650	700	800	740	712	655
12	WordPerfect	179	281	452	532	532	577
13	Bull	–	–	684	662	598	544
14	Borland	398	369	417	497	461	457
15	Legent	149	202	283	319	434	437
16	Apple	80	90	290	329	370	433
17	Autodesk	114	173	238	282	368	418
18	Software AG	154	188	236	305	335	406
19	SAP	–	–	192	271	289	400
20	SAS Institute	155	188	220	266	329	397
21	Sybase	24	57	89	133	220	355
22	Informix Software	103	145	133	149	238	328
23	Ask Group	190	238	264	305	352	322
24	Cadence Design	–	–	282	311	334	280
25	Adobe	92	121	163	223	233	279

Source: International Data Corporation, 1993

12.5% from 1992 to 1997. Spurring this solid growth will be the expected worldwide economic recovery and the advent of new technologies such as object technologies and client/server development tools and applications. The newer technologies will contribute to a minor increase in the growth rate in the mid-1990s, followed by a slight reduction in growth as this generation of technologies matures.

- The worldwide **tools** market is estimated to have grown 13.9% in 1993 to $20.5 billion, and is projected to reach $35.4 billion by 1997 with an overall CAGR of 14.6% for the 1992 to 1997 period. During the next several years, IDC expects to see a significant increase in demand for relational database management systems (DBMSs), which will continue to fuel growth in the development tool market. Although much of this demand will come at the expense of nonrelational technology, the transition from nonrelational to relational DBMSs will take years to accomplish given the large number of nonrelational legacy applications of a mission-critical nature.
- Worldwide **application solution** markets are estimated at $29.2 billion in 1993, an increase of 12.4% over 1992, reaching $48.3 billion by 1997 with an average CAGR of 13.4% for the 1992 to 1997 period. IDC expects a steady growth rate in the mid-1990s due to continued demand for client/server and distributed packaged applications and exploitation of new applications for workflow automation.

Worldwide Packaged Software Market: Major Sectors 1991–1993



Source: International Data Corporation, 1994

- Worldwide **system-level software** markets are expected to grow 8.3% in 1993 to $21.9 billion, reaching $32.3 billion by 1997 with an average CAGR of 10.1% for the 1992 to 1997 period. IDC expects the growth rate for system-level software to increase very slightly by 1995, then to decline as the demand for mainframe and minicomputer operating systems continues to erode. Margin reductions will accelerate as advanced operating systems take hold.

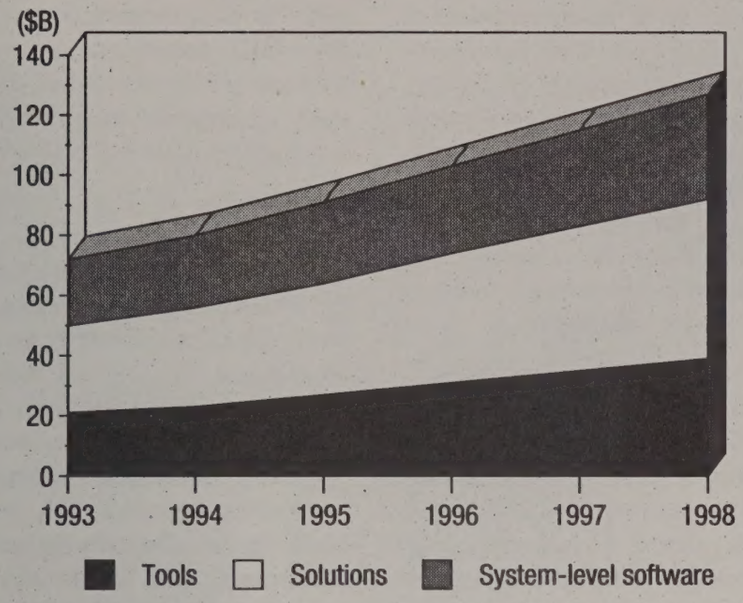
Application Development Tools

The tools market is dominated by a variety of companies, including the relational database companies, Microsoft and Computer Associates, and the PC software companies, Lotus and Borland. Continued penetration of relational DBMSs and the associated database tools, as well as the availability of 3GL, 4GL, and CASE tools, which address client/server needs, will furnish most of the expected growth in the tools market. In the DBMS market, demand is now peaking for the replacement of nonrelational engines with engines based on relational data structures. In the 3GL and 4GL markets, GUI builders and tactical tools for building the first generation of client/server applications will be responsible for most short-run growth.

At the same time, CASE vendors are finally beginning to catch the client/server "wave" and are just now beginning to offer products with the ability to generate a new generation of applications. In the mid-1990s, demand for tools to facilitate the implementation of client/server applications will take over as the market driver. IDC user surveys show that demand for tools to build multimedia applications will not significantly materialize until the mid-1990s and can be expected to develop in tandem with the more sophisticated client/server tools. Demand for these tools will rise gradually for the rest of the decade as sites move from the experimentation stage of multimedia and client/server applications to the replacement of significant fractions of their code base with applications based on these new technologies.

In the short run, demand will increase for client/server tools as organizations search for methods to enhance productivity, reduce costs, optimize resource utilization, and migrate to a more flexible and scalable computing architecture. Although most of this demand will be met in the short run by tactical tools, user needs become more sophisticated with experience and drive the demand for increased levels of tool integration, interoperation, reuse, and

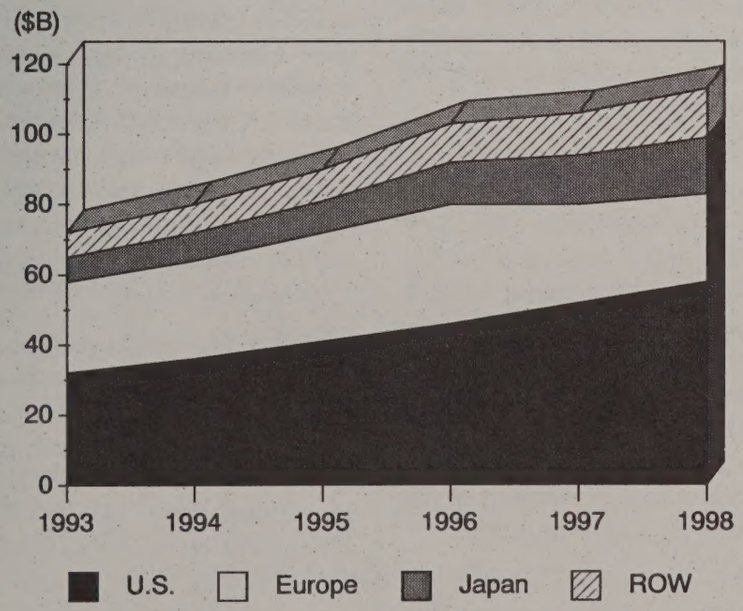
Packaged Software Demand by Sector, 1993–1998



The demand for tools for distributed applications and the popularity of the applications themselves will provide a surge in growth for both segments during the mid-1990s. Sales of tools and applications will then rise gradually for the rest of the decade as sites move from the experimentation stage of multimedia and distributed applications.

Source: International Data Corporation, 1994

Packaged Software Demand by Region, 1993–1998



Global market expansion has been and continues to be a key source of new revenue for application software firms. Sales are increasing outside the still-dominant U.S. market, particularly in Japan and the ROW.

Source: International Data Corporation, 1994

maintainability. Object-oriented languages will also see rapid growth due to their ability to provide a more intuitive and flexible basis for application development. In the long run, tools that deliver on the promise of distributed computing will see tremendous growth. Overall growth of distributed computing tools is expected to be in the 30% to 40% range over the next five years.

Application Solutions

IDC expects a steady growth rate in the mid-1990s due to continued demand for client/server and distributed packaged applications and exploitation of new applications for workflow automation. Improved access to information is integral to the success of these applications. Information integration and multimedia features will also be drivers for the solutions market in the mid- to late 1990s.

A new wave of client/server and other distributed solutions will continue to displace the host-based applications over the forecast period. This replacement process will be gradual, given the complexity of building the applications and the organizational changes necessary to successfully deploy such information architectures.

The ascendancy of PC-oriented vendors as the top share holders is expected to continue until the mainframe- and midrange-oriented vendors start to ship distributed or client/server offerings. This is necessary if they are to capture the heavy spending potential for "right-sizing" applications in existing mainframe and minicomputer shops.

Continued growth in the solutions market will be fueled by two key factors: next-generation applications and market expansion.

First, mature application market segments such as accounting and manufacturing will receive a surge of new spending as companies reengineer business processes and migrate to distributed architectures. A new generation of applications leveraging powerful and flexible new technologies will both drive and enable this migration. In particular, this new generation of applications exploits client/server architectures, graphical user interfaces, and powerful server and desktop operating environments. Particularly toward the end of the forecast period, object, multimedia, and intelligent agent technologies will increasingly become the basis for innovative solutions to long-existing business problems.

Advancements in both computing and communications technology are providing a backbone for revenue opportunities on two other key fronts: virtual office and consumer markets. The virtual office concept is rapidly taking hold, largely fueled by advancements in portable technologies amenable to professionals "on the run."

As "information highway" and "interactive television" discussions mount, attention is turning to the vast uncultivated consumer market. Although the opportunity represented by this market is expected toward the end of the forecast period, the impact should be more significant beyond it, probably the end of the decade.

System-Level Software

The system software market players remain a mixed bunch. Hardware manufacturers, particularly IBM, continue to be a crucial force, but the lingering weakness of mainframe and proprietary system shipments cuts deeply into the growth that usually accompanies original system purchases. By contrast, Hewlett-Packard's growth in system-level software revenues is largely due to its Unix-based system software products. In general, growing interest in open systems has prompted most system vendors to develop products, particularly in the systems utilities segment, that connect proprietary systems with distributed environments and applications.

The market is increasingly dominated by the operating systems suppliers Microsoft (on the strength of its MS-DOS and Windows operating systems) and Novell (almost exclusively for its network operating system) and by Computer Associates (which capitalizes on the strength of its diverse offerings for mainframe shops and its strong maintenance revenue stream). Next are such companies as Legent, BMC, and Candle, which constitute yet another segment of system software — data center management software — oriented mainly toward the larger sites in the market. Like the system vendors, these firms must move toward open computing software products or suffer the consequences.

IDC expects the growth rate for system-level software to increase very slightly by 1995, then to decline as the demand for mainframe and minicomputer operating systems continues to erode. Lower price points for "open" operating systems and newer advanced operating systems such as Windows/NT will reduce margins in the largest segment of the system-level software market.

This erosion will counter a relatively healthier market for middleware, network operating systems, and new systems management tools for the distributed open-systems market, which will be the market drivers. IDC expects these segments to grow worldwide as data centers continue to consolidate and as enterprises seek to manage their expanded, distributed, heterogeneous networks in more efficient, cost-effective ways.

In spite of the erosion of operating-system markets, the system-level software market will be driven by two major demands. First, the continuation of the networking of PCs in local area networks and the integration of LANs and other systems into the centrally managed enterprise-computing resource will pose a challenge to software vendors, because users will increasingly require that the management of this heterogeneous enterprise network be managed remotely and thus automated. Second, the development of more complex applications and tools will eventually usher in significant demand for middleware packaged as such.

Software companies are increasingly finding that using third-party functions such as RPCs and SQL gateways when such functions are either de facto or de jure standards is easier than reinventing them. IDC expects the trend to drive a healthy middleware market (SQL access gateways, interchange software for multimedia information, remote procedure calls, mail services, etc.) by the mid-1990s.

Beyond the physical consolidation of data centers, system-management software can be expected to follow other applications to downsized, less costly MIPS, albeit at a slower pace. The challenge to data-center vendors is to flow with the rightsizing demand while at the same time offering users a compelling reason to maintain a subset of functions on the mainframe, because this will be the most cost-effective locus of some system-management functions.

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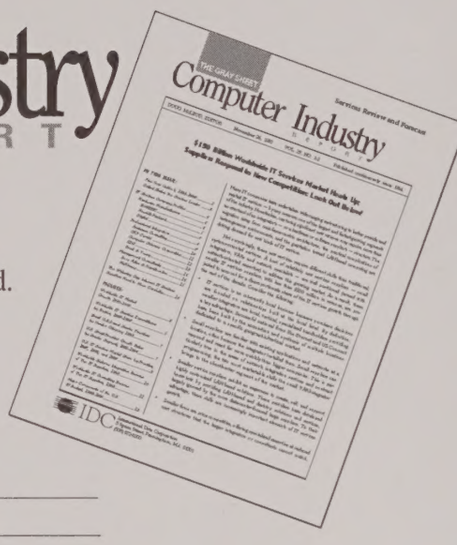

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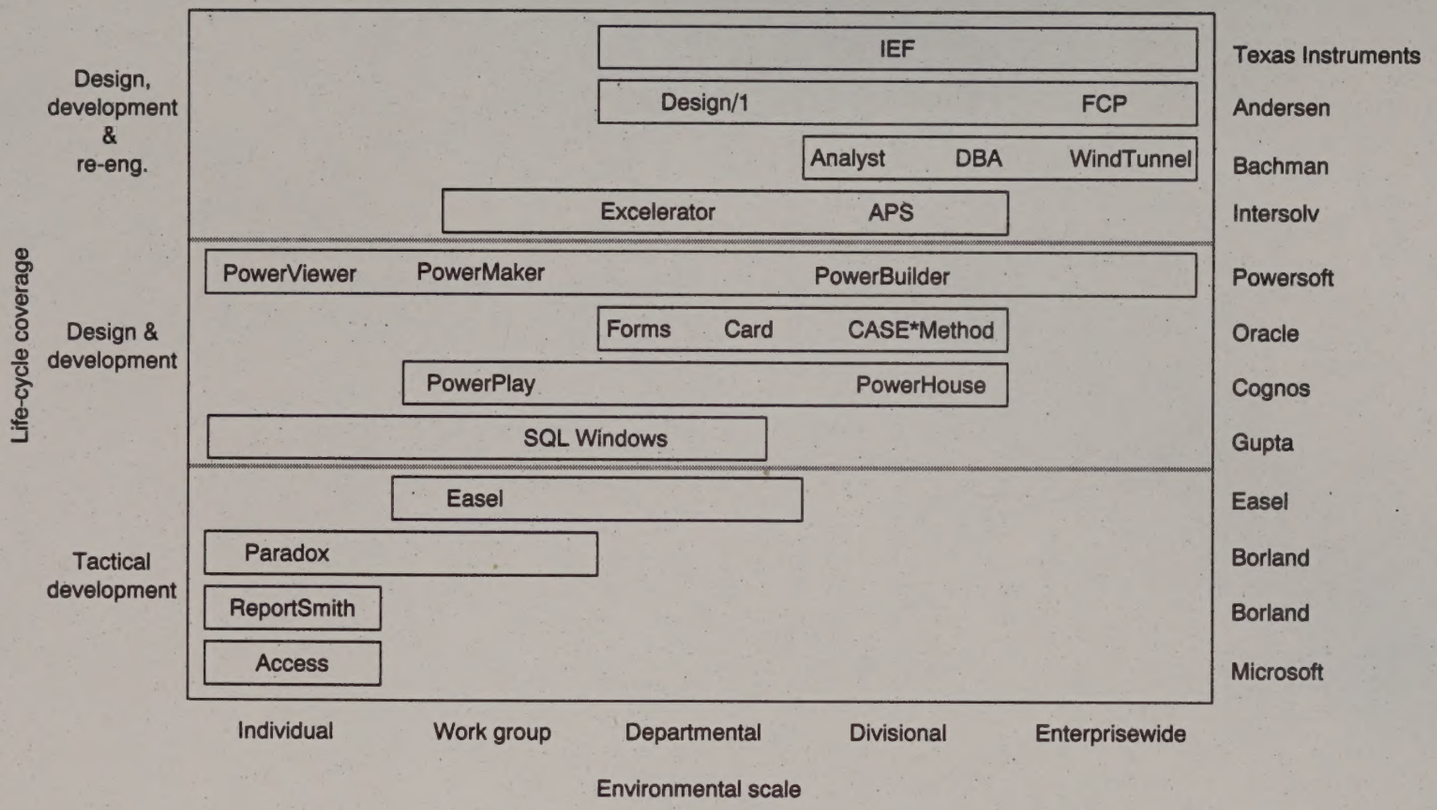
Representative Client/Server Application Development Tool Scalability



This chart provides a relative comparison of client/server application development tools based on scalability and life-cycle coverage. Greater scalability and better life-cycle coverage are emerging priorities for client/server development tools. In general, tools that provide the highest level of integrated life-cycle coverage have yet to provide scalability down to individuals and small work groups. These well-integrated and comprehensive tools also exact a high price in terms of their adherence to rigorously structured methodologies that limit their ability to be adaptive to existing workflow requirements of smaller development teams. Inversely, tactical development tools are generally targeted at individuals and smaller development teams, reflecting their desktop origins. These tools are generally not upwardly scalable due to their client-side orientation and limited ability to address life-cycle requirements.

Source: International Data Corporation, 1994

Client/Server Applications Await Development Tools

Client/server applications are increasingly viewed as valuable assets for sharing and managing vital information and as a means to competitive advantage. The technology is considered a key enabler for enhancing end-user data access across the enterprise. But overcoming barriers to their development means relying on new — and strangely new — technologies.

Nascent client/server applications are not just simple beginner systems. The first several client/server applications typically contain some complex features requiring special tools and expertise. Often, delivering quality code in the new application architecture is the largest obstacle to overcome.

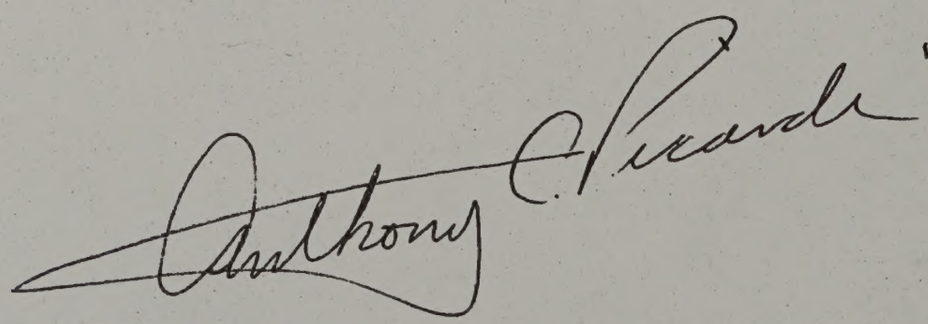
No best-development scenario has emerged that ensures success. Instead, there are several viable models: all-new applications with no reuse; migration of legacy applications; GUIs on top of existing applications. The appropriate development paradigms — team size and the extent of legacy code reuse — varies not only among sites, but from project to project depending on the application objectives and, of course, the quality of the legacy code.

Most important, it is tools that will spur users towards development, but complex, integrated toolsets constitute a substantial deterrent to acceptance. The persistent complaints from users about the difficulty of debugging and managing their applications is a clear sign that, overall, the tools in use are not up to the job. When new tools are adopted, users are looking in the right area — higher-level languages, specification repositories, and object-oriented technologies.

Nonetheless, the use of client/server tools is the only way that these applications can be implemented in the scale complexity, budget, and time frame to fulfill the promise. Winners in the race to capitalize on information will therefore be those sites that are early adopters of the more sophisticated client/server tools.

Will users be able to the meet the challenge? There is an increasing backlog of applications to be developed, and the number of users of these applications will accelerate exponentially. Managers plan to allocate an increasing share of the MIS staff to client/server projects. If this is the extent of the response, then failure could result, much of the sort that accompanied the artificial intelligence movement. In the AI movement, tools and methodologies were complex and were learned only by a small fraction of the development community.

To broaden client/server tool usage, software firms need to implement product strategies that lower adoption barriers. This means tools that are easy to use, that are free from rigid methodologies, and that provide scalable functionality to handle increasingly complex applications. To be successful, developers must increase their productivity by multiples, not by fractions. This means **flexible, portable,** and **maintainable** tools and learning the new techniques that go along with them. Some specification-driven products already exist from LBMS, Uniface, Sybase, and CASE vendors such as Software AG, Texas Instruments, and Intersolv. The client/server movement is already far more widespread than AI. It will likely flourish and, in the process, change the way applications are developed and maintained.



THE GRAY SHEET
Computer Industry REPORT

DOUG McLEOD, EDITOR | February 25, 1994 | VOL. 29, NO. 8–9 | Published continuously since 1964.

Crosscurrents of Change Redistribute IT Revenues in 1993, Create New Rules for 1994

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Five forces, some internal to the IT industry, some external, have led to a radical, if in certain respects temporary, redistribution of revenue among its vendors, to U.S. companies rather than European or Japanese vendors, and to major U.S. companies at the expense of their smaller competitors.

- The U.S. economic recovery has buoyed revenue growth for U.S.-based vendors.
- The nagging recessions in Europe and Japan have affected most vendors, but local suppliers more than their U.S. counterparts, who gained share on a worldwide basis.
- The disproportionate economic scenarios were exaggerated by currency fluctuations, which diminished international revenue opportunities for U.S. vendors, but increased the relative size of the more potent U.S. market.
- The new economics of the desktop revolution have shifted the balance of power to larger PC hardware and software manufacturers.
- The transition from hardware to software and services continued, to the benefit of U.S. vendors in software and even in the largely localistic services sector.

The IDC database of 150+ U.S.-based vendors underscores these developments. The strength of major U.S. players was revealed as composite worldwide revenue in the group rose 10% for the year, or 7% without semiconductors and components, which represent a significant degree of double-counting with other categories. These averages were stabilized by matching fourth-quarter results. Annual margins improved, bolstered by strong 4Q results.

This expansion should be viewed in context:

- IDC's preliminary results indicate that U.S. IT vendors' worldwide revenue grew around 4%, which would leave a significant gap for privately held and smaller public U.S. companies, primarily PC hardware and software manufacturers, from the 7% figure derived from the database.

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- IDC estimates that the U.S. IT market grew 8% in 1993, in sharp contrast to the sum of non-U.S. markets, which expanded by only 2% in local currencies, and *fell* 2% in U.S. dollars at current exchange rates.
- Preliminary indications are that, in the currency of their headquarters, European vendors grew only 1%, while Japanese manufacturers' revenue fell 4%.
- As a result, the United States accounted for 40% of the worldwide IT market for the first time since 1987.

The question then becomes the extent to which the same factors will remain in force through 1994. IDC does not forecast exchange rates, but based on our local offices' current feel for economic conditions and industry trends, we expect that the United States will again outpace other major IT markets in 1994, although in a somewhat less dramatic fashion. U.S. expansion may be a percentage point or so lower than last year, while European growth will probably be about a percentage point better, and Japanese revenue is expected to be flat rather than fall again.

These factors create the arena in which IT vendors will play in 1994. The industry's winners and losers, though, will depend on internal competitive situations within each product sector.

Systems

The transition continues. Once again, revenue growth was tepid: 1% for the quarter, 1% for the year. The cost of the transition is on the bottom line, where companies continue to take charges to attempt to bring costs into line. In the plus column, of the 25 companies in the sector announcing net income, 15 did better in 1993 than in 1992. But 10 of the 25 had losses for the calendar year as a whole (not necessarily equivalent to the companies' fiscal years), marginally better than the 12 in 1992, but not good news for the newly unemployed.

Moreover, the number of significant losses — arbitrarily defined here as losses representing at least 10% of annual revenue — was about even with the previous year, as we can see by comparing the losses within the group for the two years. Significant losses are italicized.

1993	1992
Amdahl	Alpha Micro
Concurrent	Amdahl
Convex	*Control Data*
Data General	Cray
Digital	Data General
IBM	*Digital*
Intergraph	IBM
Sequent	*Pyramid*
StorageTek	*Sequoia*
Tandem	Silicon Graphics
	Tricord
	Wang

The upside is that the lists also demonstrate that bitter medicine sometimes works. Of the 12 vendors registering losses in 1992, 8 posted profits in 1993 (albeit paper profits in the case of Wang). Of the five companies that rang up significant losses in 1992 due to the extent of their write-offs, only Digital has also endured a loss in 1993.

But systems vendors can't shake the recurring disease that forces them to the medicine cabinet. Since 1985, only HP has seemed immune to the torturous cycle of weak revenue due to poor sales, lower ASPs, or both; retrenchment through layoffs and write-offs; and temporary profit spurts until the weak revenue catches up with them again.

The crisis can be triggered by different events or situations. In the case of IBM, it was several things, including an unwillingness to confront the changes necessary in its internal decision-making processes when the markets to which those processes were rational responses began to change. For Digital, it was a bloated cost structure that moved from dysfunctional to disastrous when (1) the transition to Alpha curbed revenue growth, and (2) the downsizing trend pushed the product mix to the lower-margin low end. For Unix vendors, it has typically been product cycles. But

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Selected U.S.-Based IT Vendors' Industry Revenues, Net Income, and Pretax Income Summary for Q4 93 and Q4 92 ($M)

	Revenue			Net Income			Pretax Income		
	Q4 93	Q4 92	% Change	Q4 93	Q4 92	% Change	Q4 93	Q4 92	% Change
Systems vendors	37,492.9	37,091.5	1.1	433.7	(5,077.8)	n/a	765.7	(6,410.7)	n/a
Sys. vendors w/o IBM	18,096.9	17,531.5	3.2	433.3	385.2	12.5	765.0	537.3	42.4
PC manufactuers	6,187.5	4,479.0	38.1	224.1	287.7	-22.1	321.5	452.1	-28.9
Sys. vendors and PC Mfr.	43,680.4	41,570.5	5.1	657.8	(4,790.1)	n/a	1,087.1	(5,958.6)	n/a
Storage	3,262.6	3,307.4	-1.4	(136.3)	168.5	n/a	(42.9)	203.6	n/a
LAN communications	1,621.4	1,159.5	39.8	249.2	139.1	79.2	393.3	239.6	64.1
LAN comm. w/o Novell	1,310.1	899.3	45.7	176.4	68.2	158.7	283.8	132.2	114.6
Data communications	503.0	369.2	36.2	65.4	32.3	102.5	92.2	43.3	113.0
Total communications	2,124.4	1,528.7	39.0	314.6	171.4	83.6	485.5	282.9	71.6
Software	4,859.5	4,240.4	14.6	651.3	470.9	38.3	1,032.6	765.8	34.8
Application solutions	1,172.8	1,112.2	5.4	52.3	90.9	-42.4	108.8	145.4	-25.2
Application tools	1,496.6	1,249.6	19.8	137.8	32.8	319.6	227.9	92.6	146.1
System software and utilities	2,190.0	1,878.6	16.6	461.2	32.8	1304.6	695.9	527.8	31.9
Software w/ Novell	5,482.2	4,760.8	15.2	796.9	612.7	30.1	1,251.6	980.6	27.6
Software w/ IBM SW revenues	8,551.2	7,949.8	7.6	n/a	n/a	n/a	n/a	n/a	n/a
Semiconductors	11,523.4	9,083.7	26.9	1,224.3	739.2	65.6	1,830.2	1,059.4	72.8
Services	3,575.8	3,326.7	7.5	306.6	267.1	14.8	461.6	401.9	14.9
Other	2,476.2	2,028.0	22.1	23.7	32.8	-27.8	43.7	42.0	4.0
Total w/o semiconductors	59,978.9	56,001.6	7.1	1,817.7	(3,679.3)	n/a	3,067.7	(4,262.4)	n/a
Total w/o IBM	52,106.2	45,525.4	14.5	3,041.6	2,522.9	20.6	4,897.3	3,744.9	30.8
Total	**$71,502.2**	**$65,085.4**	**9.9%**	**$3,045.0**	**($2,932.9)**	**n/a**	**$4,897.9**	**($3,203.1)**	**n/a**

International Data Corporation, 1994

the crisis is always there, just around the corner, waiting for a signal to start.

For mainframes, there have been few moments of respite over the past eight years. Mainframes aren't dead, they're contracting — but you feel the pain of contraction, you don't feel death, at least for very long. And mainframe vendors will be feeling the pain for at least the remainder of the decade while they shift from ECL to CMOS, integrate parallel technology, and provide tools for client/server integration, all on fewer dollars than the year before. Mainframes aren't dead, but traditional mainframe margins are.

In the midrange, moderate contraction will again be the rule in 1994, with a drop in worldwide revenue of about the same magnitude (2–3%) as in 1993. Digital will still not be in a position for strong Alpha-oriented growth, IBM will do somewhat better with its new AS/400 models, and HP probably has at least another year of strong market share gains, although probably not at the extraordinary pace set in 1993.

Workstations aren't in crisis, but must start adjusting to a new lower-growth business model. The low growth of nonserver revenue in 1992 continued in 1993, with a new fillip: the first year of single-digit unit shipment growth since the workstation market first appeared. The major vendors picked up share from the lesser players, but are taking different approaches to the changed business model. Sun, for instance, is obviously tempted to change the model by redefining the market into a merged high-volume PC/workstation industry. After all, by virtually any measure, for the first time PCs did better in 1993 than workstations.

Personal Computers

The personal computer market continues its ricochet from the market trends that dominated the late 1980s. Then, inexpensive clones significantly outperformed the big-name manufacturers. Their heyday permanently changed the competitive structure of the sector: several of the most successful cloners are themselves now big-name manufacturers, while their emphasis on price has become the industry mantra.

The major PC suppliers are remembering the lesson that the clones taught them. And, they will be better for it. Today, smaller companies are no longer able to keep up the pace set by the high-volume big-name manufacturers. This lag is a major factor in the differential between the 7% growth shown in the IDC database and the 4% growth for all U.S.-based vendors estimated by IDC.

These considerations explain the extremes in the 1993 results for the PC grouping from the database: up 41% in revenue, down 63% in net income, pretax margins slipping from 9% to 2%.

Holiday and year-end buying, on top of continuing high fundamental demand for PCs, produced another strong quarter for the PC industry. Revenue for the publicly held PC companies was up as a group, both sequentially and versus last year's very strong final period. Overall margins, while far from robust, were the best since the first quarter of 1993.

Compaq turned in another strong period, with sales up 55% versus Q4 1992 and 26% higher than this year's vigorous third quarter. AST, bolstered by its acquisition of Tandy's PC manufacturing business, had an awesome period, with revenue rising 95% year-over-year, and 32% sequentially. IDC estimates that AST's Tandy-related revenue fell between the third and fourth-quarter, so the large sequential increase shows the strength of demand for AST's own product lines.

Demand for Macintosh systems was also up, with Apple posting year-over-year and sequential sales increases of 23% and 15%, respectively. The Performa line of consumer-oriented Macs did especially well, with over 150,000 units shipped. Notably, high-end Mac systems had a record quarter, too, despite all of the publicity about Apple's forthcoming PowerPC-based Macintosh.

Some of the smaller vendors also demonstrated improved performance. ALR had its first profitable quarter in over a year, eking out earnings of $0.5 million. The company attributed the improvement to sales of high-end 486 and Pentium systems, and to cost savings stemming from restructuring done in the previous quarter.

Indeed, profitability improved for many of the publicly-held PC companies. Compaq presented another stellar performance, recording net income of $151 million, the highest for any quarter in the company's history. Gross margins remained stable, while operating margins expanded, thanks to higher sales. AST demonstrated its ability to grow and earn money while absorbing the Tandy acquisition and restructuring its manufacturing operations. Apple's profits, while weak compared to a year ago, look much better against the company's second quarter loss and the minuscule earnings of the third quarter.

But are profits everything? Revenue growth counts for something, too, and so does market share. That's why, with regard to

Selected U.S.-Based IT Vendors' Industry Revenues, Net Income and Pretax Income Summary for the Full Year, 1993 and 1992 ($M)

	Revenue			Net Income			Pretax Income		
	1993	1992	% Change	1993	1992	% Change	1993	1992	% Change
Systems vendors	130,629.6	129,541.6	0.8	(7,210.7)	(6,643.0)	n/a	(6,372.5)	(9,018.8)	n/a
Sys. vendors w/o IBM	67,913.6	65,018.6	4.5	1,061.9	(1,678.0)	n/a	(7,755.1)	(2,944.8)	n/a
PC manufacturers	20,874.1	14,884.5	40.2	321.7	868.1	-62.9	441.3	1,335.5	67.0
Sys. vendors and PC Mfr.	151,503.7	144,426.1	4.9	(6,889.0)	(5,774.8)	n/a	(5,931.2)	(7,683.3)	n/a
Storage	12,346.4	11,864.0	4.1	(749.8)	667.6	n/a	(684.5)	851.1	n/a
LAN communications	5,621.7	3,985.5	41.1	902.3	582.6	54.9	1,314.7	908.1	44.8
LAN comm. w/o Novell	4,460.2	3,035.2	46.9	609.3	328.7	85.4	1,311.3	901.8	45.4
Data communications	1,665.9	1,257.6	32.5	175.2	69.6	151.6	240.0	90.4	165.6
Total communications	7,287.5	5,243.1	39.0	1,077.5	652.3	65.2	1,554.8	998.5	55.7
Software	17,521.5	15,104.5	16.0	1,690.2	1,282.2	31.8	3,306.9	2,493.6	32.6
Applications solutions	4,103.2	3,830.6	7.1	156.2	233.0	-33.0	303.6	350.1	-13.3
Application tools	5,452.9	4,597.2	18.6	398.3	166.5	139.2	668.1	408.7	63.5
System software and utilities	7,965.4	6,676.8	19.3	1,135.6	882.7	28.6	2,335.2	1,734.8	34.6
Software w/ Novell	19,844.4	17,005.1	16.7	2,276.3	1,790.1	27.2	4,192.1	3,263.1	28.5
Software w/ IBM SW revenues	30,797.4	28,108.1	9.6	n/a	n/a	n/a	n/a	n/a	n/a
Semiconductors	40,578.9	32,364.9	25.4	4,315.4	2,048.6	110.7	6,483.4	2,948.9	119.9
Services	13,638.1	12,998.0	4.9	868.7	811.3	7.1	1,694.6	1,493.3	13.5
Other	9,016.2	7,528.6	19.8	14.2	24.2	-41.2	323.0	58.0	456.7
Total w/o semiconductors	211,313.3	197,164.4	7.2	(4,315.4)	(2,048.6)	n/a	263.6	(1,788.7)	n/a
Total w/o IBM	189,176.2	165,006.3	14.6	8,272.6	4,965.0	66.6	5,364.3	7,234.2	-25.8
Total	**$251,892.2**	**$229,529.3**	**9.7%**	**$339.2**	**($268.9)**	**n/a**	**$6,747.0**	**$1,160.2**	**481.6%**

International Data Corporation, 1994

Dell, while we understand Wall Street's enthusiasm over cost controls that translated into significantly better margins than expected, IDC is concerned about the weak revenue and unit growth, including a sequential revenue and unit shipment drop from the third to the fourth quarter. Although much of the slack at Dell compared to its major competitors can be ascribed to the notebook mess, Dell did not keep its eye on the bouncing price ball and lost share in desktop sales as well. With new portables and servers in the hopper and a renewed commitment to price competitiveness, Dell has the potential to pick up steam again — but it had better be soon.

The first calendar quarter is often a rough one for the PC industry, as demand slackens after the fourth-quarter surge. Nevertheless, Compaq should have a fine quarter, as the company is likely to maintain its gross margin even as demand oscillates. Indeed, if reports of unsatisfied year-end demand are true, Compaq's revenue could even rise sequentially, as it did in Q1 1993.

Apple, on the other hand, will certainly have lower sales sequentially, due both to the usual seasonal pattern and to customers postponing purchases while waiting for PowerPC. If Macintosh demand doesn't fall too much, Apple should turn a small profit for the quarter. Restoration of solid profitability will have to await market acceptance of the PowerPC-based Macintosh, however. AST and ALR are also likely to have somewhat lower sales sequentially, which in ALR's case could mean a return to the loss column.

For the rest of 1994, the outlook brightens. IDC is forecasting continued double-digit unit growth in PC sales, 12% in the United States. Among the reasons for this is that Intel is accelerating the release of higher-performance processors and lowering the prices of existing chips. Demand for PCs for home use, especially those equipped for "multimedia" applications, is very strong, and the gains in price performance and the heavy demands of the latest software are encouraging businesses to upgrade their equipment. If the industry can avoid another ruinous price war, it should enjoy a prosperous year.

Storage

For the HDD industry, 1993 ended on an uptick. The benefits of a strong Christmas quarter selling season for computer systems all but eliminated excess drive inventories, and in fact left suppliers unable to fully meet demand. What other industry vacillates between prosperity and privation in less than a year?

A stronger state of demand held the quarter-to-quarter price declines to a manageable 4–5%, allowing the industry to translate unit growth into a 5% increase in sequential quarter revenues. Virtually all suppliers surprised on the upside in the quarter: Conner, Quantum, and Western Digital all returned to profitability, and Seagate sustained its industry-leading gross margins.

A sizable loss at Maxtor (augmented by $88 million in restructuring charges), and generally poor results from component suppliers pulled the group's performance down; Komag chose the December quarter to finally restructure its relationship with Dastek (recording heads), resulting in a $35.4 million extraordinary charge. Though it is typical for component companies to lag in a recovery, we remain concerned about an industry oversupply of thin film heads that will keep pressure on prices and margins in this segment for at least another quarter.

At the halfway point in the first calendar quarter of 1994, the recurring question is, "How strong and for how long?" Inventory levels throughout the channel remain low, computer systems demand continues strong, and new product cycles are allowing for supplier differentiation. Nevertheless, we are carefully monitoring the steadily increasing level of output for the industry's leading suppliers; in our view, the industry will increase shipments close to 10% in the current period versus 7% in the December quarter. Too much production too soon would stop the recovery in its tracks.

In general, most tape drive manufacturers experienced a strong last quarter of 1993. Exabyte's quarterly revenue was a company record, given a strong distributor channel and a partial recovery of the European market. Rexon reversed its declining revenue trend. However, the company still faces a significant challenge to maintain market momentum as the company executes on major reorganizational changes.

Looking to 1994, we expect demand for tape to remain strong. Those manufacturers supplying DC2000, 4mm, half-inch cartridge and automation technologies are expected to benefit the most.

Communications

Bliss it was to be in LANs in 1993. All the big players got bigger, with enough spillage that most of the smaller competitors did fine as well. Except for Proteon, demand and market dynamics combined to create the best of all possible worlds for vendors: exceptional revenue growth, even stronger margins, and

Q4 and Year Total of 1993 and 1992 Revenues from Selected U.S.-Based IT Vendors ($M)

	Quarterly			Year Total		
Revenues in Millions	**Q4 93**	**Q4 92**	**% Change**	**1993**	**1992**	**% Change**
Computer Systems						
Alpha Micro*	10.4	10.8	-4.1	39.0	47.9	-18.6
Amdahl	442.9	745.0	-40.5	1,680.5	2,524.7	-33.4
Auspex	20.4	16.4	24.5	82.2	60.0	37.0
Concurrent	40.7	54.5	-25.3	201.9	215.1	-6.1
Control Data	137.1	151.6	-9.6	451.8	516.0	-12.4
Convex	46.0	61.9	-25.8	193.1	231.8	-16.7
Cray	302.6	227.3	33.1	894.9	797.6	12.2
Data General	261.2	279.6	-6.6	1,059.4	1,100.8	-3.8
Digital	3,254.1	3,689.4	-11.8	13,636.7	14,162.0	-3.7
EMC	248.6	117.8	110.9	765.8	366.6	108.9
Hewlett-Packard*	5,682.0	4,573.0	24.3	21,426.0	17,120.0	25.2
IBM	19,396.0	19,560.0	-0.8	62,716.0	64,523.0	-2.8
Intergraph*	268.5	307.3	-12.6	1,050.3	1,176.7	-10.7
NCR*	2,300.0	2,150.0	7.0	7,266.0	7,141.0	1.8
NetFrame	20.1	11.9	68.4	66.9	39.1	71.4
Pyramid	60.0	55.1	8.9	238.6	197.9	20.6
Sequent	104.3	88.7	17.6	353.8	307.3	15.1
Sequoia	11.1	11.0	1.0	41.6	51.6	-19.4
Silicon Graphics	370.4	270.2	37.1	1,262.0	948.8	33.0
StorageTek	400.2	421.3	-5.0	1,372.7	1,528.5	-10.2
Stratus	148.1	134.9	9.8	513.7	486.3	5.6
Sun Microsystems	1,130.7	1,050.8	7.6	4,493.0	3,831.7	17.3
Tandem	475.6	483.9	-1.7	2,022.6	2,066.3	-2.1
Tricord	29.2	11.4	155.9	80.0	33.4	139.3
Unisys	2,101.1	2,256.4	-6.9	7,742.5	8,421.9	-8.1
Wang	231.8	351.3	-34.0	978.5	1,645.7	-40.5
Subtotal	**$37,492.9**	**$37,091.5**	**1.1%**	**$130,629.6**	**$129,541.6**	**0.8%**
Personal Computers						
ALR	49.6	42.5	16.7	176.4	200.0	-11.8
Apple	2,468.9	2,000.3	23.4	8,445.5	7,224.2	16.9
AST Research	677.0	346.3	95.5	1,970.9	1,140.5	72.8
Compaq	2,202.0	1,422.6	54.8	7,191.9	4,099.8	75.4
Dell*	742.9	620.3	19.8	2,873.2	2,013.9	42.7
Zeos	47.1	46.9	0.4	216.2	206.1	4.9
Subtotal	**$6,140.4**	**$4,432.1**	**38.5%**	**$20,657.9**	**$14,678.4**	**40.7%**

Q4 and Year Total of 1993 and 1992 Revenues from Selected U.S.-Based IT Vendors ($M)

Continued

	Quarterly			Year Total		
Revenues in Millions	**Q4 93**	**Q4 92**	**% Change**	**1993**	**1992**	**% Change**
Storage						
Adaptec	91.2	96.3	-5.3	179.1	171.3	4.5
Applied Magnetics	71.2	74.6	-4.4	332.6	288.7	15.2
Conner Periph.	574.4	620.5	-7.4	2,151.7	2,238.4	-3.9
Exabyte	83.2	70.6	17.8	310.3	287.4	7.9
Iomega	37.5	37.5	0.1	147.1	139.2	5.7
Komag	91.2	96.3	-5.3	385.4	326.8	17.9
Maxtor	318.1	402.6	-21.0	1,237.8	1,397.0	-11.4
Micropolis	90.4	91.5	-1.2	382.9	396.6	-3.4
Quantum	523.0	459.3	13.9	2,002.7	1,536.2	30.4
Read Rite	100.0	139.4	-28.3	443.0	461.0	-3.9
Rexon	48.0	47.8	0.3	189.5	210.4	-9.9
Seagate	815.9	776.8	5.0	3,114.1	3,079.5	1.1
Syquest	47.3	50.7	-6.7	203.0	194.1	4.6
Western Digital	371.1	343.5	8.0	1,267.2	1,137.5	11.4
Subtotal	**$3,262.6**	**$3,307.4**	**-1.4%**	**$12,346.4**	**$11,864.0**	**4.1%**
LAN Communications						
3Com*	205.3	152.7	34.4	696.2	520.2	33.8
Artisoft	21.2	23.8	-11.0	80.1	87.7	-8.7
Banyan	32.8	30.6	7.2	127.8	113.5	12.6
Cabletron*	156.5	110.4	41.7	552.9	377.5	46.5
ChipCom	44.3	27.8	59.3	150.0	87.3	71.9
Cisco Systems	302.2	145.1	108.3	928.2	473.5	96.0
CrossComm	14.7	9.0	63.1	49.8	29.3	69.8
Lannet	14.4	12.3	16.8	49.6	46.8	6.0
Network General	28.8	24.9	15.5	99.7	79.3	25.8
Network Systems	67.1	58.9	13.9	215.6	219.1	-1.6
Novell*	311.4	260.2	19.7	1,161.5	950.3	22.2
Proteon	20.4	31.6	-35.3	103.4	120.3	-14.0
Retix	17.1	19.2	-10.9	59.8	70.8	-15.6
SMC*	88.9	65.1	36.6	298.4	239.3	24.7
SynOptics	188.3	130.5	44.4	704.5	388.8	81.2
Wellfleet	87.7	40.1	118.6	267.4	123.2	117.0
Xyplex	20.3	17.3	18.0	76.8	58.6	31.1
Subtotal	**$1,621.4**	**$1,159.5**	**39.8%**	**$5,621.7**	**$3,985.5**	**41.1%**
Data Communications						
General DataCom	48.1	54.3	-11.5	195.7	195.9	-0.1
Microcom	14.8	16.6	-10.5	55.4	72.6	-23.7
N.E.T.	61.2	56.1	9.2	228.1	214.5	6.4

Q4 and Year Total of 1993 and 1992 Revenues from Selected U.S.-Based IT Vendors ($M)

Continued

Revenues in Millions	Quarterly Q4 93	Quarterly Q4 92	% Change	Year Total 1993	Year Total 1992	% Change
Data Communications — continued						
Newbridge*	145.1	83.8	73.1	472.3	253.1	86.6
Stratacom	20.3	16.0	27.2	74.4	55.1	34.9
Telebit	23.6	21.8	8.2	80.8	87.3	-7.5
Tellabs	107.2	87.6	22.4	320.5	258.6	23.9
US Robotics	82.7	33.1	150.1	238.8	120.6	98.1
Subtotal	**$503.0**	**$369.2**	**36.2%**	**$1,665.9**	**$1,257.6**	**32.5%**
Software						
Application Solutions						
Adobe*	86.5	70.7	22.4	313.5	265.9	17.9
Aldus	57.4	45.9	25.1	206.8	174.1	18.7
American Software*	24.3	25.7	-5.3	97.6	109.1	-10.5
Autodesk*	102.1	98.6	3.6	405.6	353.2	14.8
Broderbund*	32.8	32.6	0.7	95.8	86.1	11.2
Cadence Design	106.1	116.9	-9.3	377.6	430.6	-12.3
Consilium*	7.0	6.0	17.1	29.0	27.4	5.9
Data I/O	14.8	18.8	-21.2	63.2	69.3	-8.9
Electronic Arts	149.5	107.1	39.6	397.7	259.8	53.1
Frame Tech	15.0	24.2	-38.0	56.1	76.6	-26.8
FileNet	45.9	31.8	44.3	158.9	138.2	15.0
HBO & Co.	65.2	60.8	7.1	237.1	202.2	17.3
Hogan Systems	18.6	17.2	7.9	64.6	65.3	-1.1
Interleaf	28.1	31.0	-9.3	113.4	115.4	-1.7
Mentor Graphics	83.8	84.0	-0.3	339.8	350.8	-3.1
PDA Engineering	10.5	11.2	-6.5	41.9	40.2	4.1
Peoplesoft	31.6	58.2	-45.8	23.4	12.8	82.8
Ross Systems	17.2	22.9	-24.7	83.9	79.8	5.1
SDRC	54.1	45.5	18.9	186.3	163.6	13.9
Shared Medical Systems	136.2	124.5	9.3	501.3	469.6	6.7
Software Pub.	22.7	36.6	-37.9	90.5	151.9	-40.4
Synopsys	34.0	21.2	60.4	79.5	51.7	53.8
Viewlogic	29.3	20.7	41.4	93.5	70.5	32.6
Subtotal	**$1,172.8**	**$1,112.2**	**5.4%**	**$4,103.2**	**$3,830.6**	**7.1%**
Application Tools						
Ask Computer	100.6	113.5	-11.4	413.5	447.9	-7.7
Bachman	9.5	9.7	-2.6	35.3	45.5	-22.4
Borland	111.7	104.3	7.1	459.5	463.7	-0.9
Comshare	23.8	26.9	-11.6	97.1	113.1	-14.1
Easel Corp.	6.6	7.7	-13.9	27.1	33.0	-17.7

Q4 and Year Total of 1993 and 1992 Revenues from Selected U.S.-Based IT Vendors ($M)

Continued

	Quarterly			Year Total		
Revenues in Millions	**Q4 93**	**Q4 92**	**% Change**	**1993**	**1992**	**% Change**
Application Tools — continued						
Gupta	18.0	11.0	63.5	56.1	32.8	71.3
Information Resources	89.0	77.0	15.5	334.5	276.4	21.1
Informix	101.4	96.0	5.6	352.9	283.6	24.4
Intellicorp	3.6	2.3	57.4	11.9	9.0	32.3
Intersolv*	20.5	21.2	-3.2	78.7	84.4	-6.7
Knowledgeware	38.2	32.6	17.2	138.5	124.3	11.5
Lotus	278.3	246.0	13.1	981.2	900.1	9.0
Oracle*	452.2	353.2	28.0	1,692.9	1,309.9	29.2
Parametric Technology	53.5	32.5	64.6	184.1	102.7	79.2
Powersoft	19.5	8.0	143.1	51.0	21.2	140.5
Progress Software*	32.5	24.4	33.2	111.6	85.0	31.3
Sybase	137.8	83.2	65.7	426.7	264.6	61.3
Subtotal	**$1,496.6**	**$1,249.6**	**19.8%**	**$5,452.9**	**$4,597.2**	**18.6%**
Systems Software and Utilities						
BMC Software	75.5	65.0	16.2	274.0	227.0	20.7
Boole & Babbage	31.1	29.5	5.6	120.0	112.3	6.9
Computer Associates	574.4	501.5	14.5	2,063.8	1,770.8	16.5
Legent Corp.	114.7	116.7	-1.7	440.2	446.1	-1.3
Microsoft	1,129.0	938.0	20.4	4,109.0	3,252.4	26.3
Phoenix Technology	23.0	18.8	22.0	80.4	71.7	12.1
Sterling Software	108.9	98.8	10.2	361.3	332.5	8.7
Symantec	67.1	61.6	8.8	235.5	238.5	-1.2
System Software*	66.4	48.6	36.6	281.2	225.6	24.6
Subtotal	**$2,190.0**	**$1,878.6**	**16.6%**	**$7,965.4**	**$6,676.8**	**19.3%**
Subtotal w/ Novell	**$5,170.9**	**$4,500.6**	**14.9%**	**$18,683.0**	**$16,054.8**	**16.4%**
Software subtotal	**$4,859.5**	**$4,240.4**	**14.6%**	**$17,521.5**	**$15,104.5**	**16.0%**
Semiconductors/Components						
AMD	413.4	400.2	3.3	1,648.3	1,514.5	8.8
Analog Devices*	179.0	148.8	20.3	698.0	588.0	18.7
Chips & Techs.	22.4	28.4	-21.0	86.8	119.2	-27.2
Cirrus Logic	149.9	99.6	50.5	478.5	307.7	55.5
Cypress	83.0	67.4	23.2	304.5	272.2	11.9
Intel	2,389.0	1,857.0	28.6	8,782.0	5,844.2	50.3
LSI Logic	189.0	161.1	17.3	718.8	617.5	16.4
Microcom	14.8	16.6	-10.5	55.4	72.6	-23.7
Motorola	4,993.0	3,711.0	34.5	16,575.0	13,303.0	24.6
National Semi*	582.4	491.9	18.4	2,190.7	1,857.6	17.9

Q4 and Year Total of 1993 and 1992 Revenues from Selected U.S.-Based IT Vendors ($M)

Continued

	Quarterly			Year Total		
Revenues in Millions	**Q4 93**	**Q4 92**	**% Change**	**1993**	**1992**	**% Change**
Semiconductors/Components — continued						
Texas Instruments	2,374.0	1,987.0	19.5	8,525.0	7,440.0	14.6
VLSI Tech	133.3	114.7	16.3	515.9	428.5	20.4
Subtotal	$11,523.4	$9,083.7	26.9	$40,578.9	$32,364.9	25.4
Services						
ADP	577.7	518.5	11.4	2,339.2	2,076.0	
Barrister Information Systems	4.7	3.8	25.5	25.0	25.6	-2.3
CACI International	44.0	37.3	17.7	155.1	143.1	8.4
Computer Sciences	621.4	608.3	2.2	2,502.1	2,474.3	1.1
EDS	2,313.8	2,144.6	7.9	8,561.8	8,218.9	4.2
Intermetrics*	14.3	14.3	0.0	54.9	60.2	-8.8
Subtotal	**$3,575.8**	**$3,326.7**	**7.5**	**$13,638.1**	**$12,998.0**	**4.9**
Other						
Bolt Beranek & Newman	48.4	59.8	-19.0	207.5	257.9	-19.5
Comdisco*	536.0	571.0	-6.1	2,118.0	2,223.0	-4.7
CompUSA	536.9	324.5	65.4	1,727.6	1,041.9	65.8
InaCom	440.4	277.2	58.9	1,545.2	1,014.4	52.3
Key Tronic	41.3	32.6	26.5	136.5	133.2	2.5
MicroAge*	470.4	327.9	43.5	1,652.4	1,098.6	50.4
QMS	70.7	77.3	-8.6	290.8	275.8	5.4
Qume*	14.9	24.2	-38.3	66.8	140.2	-52.4
Tektronix*	317.2	333.5	-4.9	1,271.5	1,343.6	-5.4
Subtotal	**$2,476.2**	**$2,028.0**	**22.1%**	**$9,016.2**	**$7,528.6**	**19.8%**
Total	**$71,502.2**	**$65,085.4**	**9.9%**	**$251,892.2**	**$229,529.3**	**9.7%**

**All results represent Q4 94 ending December 31, 1993, except for: 3Com, Cabletron, Intermetrics, Progress Software, SMC, Qume, Alpha Micro, Broderbund Q4 ending November 30; Tektronix Q4 ending November 27; Adobe Q4 ending November 26; Comdisco Q493 reflects a $20 million change in accounting principle; Intergraph includes a $75.7 million pretax restructuring charge; Analog Devices, National Semi Q4 ending Oct. 30; Newbridge, MicroAge, Novell, System Software, Consilium, Dell, and American Software Q4 93 ending January 30.*
NCR posttax operating income was approximately $60M including restructuring charges of $120 million after taxes.

Source: International Data Corporation, 1994

a forgiving market where it's pretty hard to screw up.

This environment should last at least another year. There are no major product transitions to manage, at least in hardware, and the technology curves are relatively easy to manage. Prices have been dropping, but manufacturing efficiencies are compensating so well that margins have been rising. A vendor here or there may get squeezed by some of the major competitors, another may mess up in marketing or manufacturing, but absent serious mistakes, most can expect a strong 1994.

The major product transition remains in software, where NetWare 3X products still account for 50% of Novell's business, and the inevitable bugs in 4.0 and 4.01 generate almost as much bad press as revenue. But a little perspective: 22% revenue growth for the year, 20% for the quarter, and aftertax margins of 25% for the year and 23% for the quarter are the kind of problem a lot of other vendors would kill for.

In data communications, a common theme was the extensive investment in their products by the phone carriers, which bolstered results for, among others, Newbridge and Tellabs. We are currently going through a period of intense infrastructure redesign in the telecommunications industry that should help out their cousins in data communications for at least another year.

Software

The inherent strength of the independent software vendor (ISV) market was reaffirmed in 1993. As IBM's software business starts to dwindle, the last of the major systems vendors to play a significant role in software is moving towards the exit. This transition inevitably depresses the total for IDC's software market totals, but it is good news for the ISVs in and outside the database.

But other transitions are complicating the picture for many ISVs. IDC is bullish about the ISV software market over the next few years because two new (often intertwined) technologies, client/server applications and object-oriented programming, will generate new vendors and new product generations for the established players. But in the early years of the transition, amid considerable user (and vendor) confusion, we are seeing sales cycles starting to stretch out. As a result, ISVs did not quite meet IDC's revenue forecasts for 1993, and there may be slight downward revisions for 1994. But these should be viewed as momentary bumps before the market picks up renewed speed.

On the margin side, pricing was a major issue on the PC side and a serious concern for other software platforms. Pricing wars sharply pruned results in several markets; for example, IDC estimates that the 1993 PC spreadsheet market grew by about 25% in unit shipments, while revenue shrank by 1%. We even started to see the first downward pressure on prices on the early areas of client/server adoption, such as accounting and human resources. Other markets, notably low-end database programs, started to bifurcate into two entities, a low-end, price-sensitive side and a high-end, less pressured component.

PC software pricing may somewhat stabilize this year, depending in part on how Microsoft is doing. It may be tempted to do something to generate sales volume later in 1994, during what promises to be a product announcement lull before Chicago is launched. Currently IDC expects delivery of a somewhat stripped-down version of Chicago in December to help end-of-the-year numbers for Microsoft.

On the human interest as well as financial sides, no IT story in 1993 has been more heartening than the resurgence of Lotus. Jim Manzi may not rank high among software executives within press and pundit circles, but when was the last time that a major CEO in this industry bet the ranch on a new, untried technology miles away from their major product lines — and won? Lotus Notes still has no competitor and looks to be even more of an industry standard than 1-2-3, if only because it will insinuate itself into the interstices of corporate communications throughout major global companies.

Semiconductors/Components

Mercury Research, a partner of IDC specializing in semiconductors, notes that in 1993 the semiconductor industry, buoyed by seemingly insatiable demand for personal computers as well as the worldwide manufacturing capacity shortage, experienced its best year since the boom of 1988, growing nearly 30% from 1992.

The semiconductor stocks in IDC's database reflected both trends. Revenue for this sector jumped 27% for the fourth quarter, and 25% for all of 1993. Net income skyrocketed even faster, reflecting unsatiated demand due to the manufacturing capacity crunch. For the fourth quarter, net income climbed 66%, and for the year, 111%. Pretax margins for the quarter and year reached a very impressive 16%.

Cirrus Logic extended its domination of the desktop PC graphics market in the fourth quarter, capitalizing on the trend towards Energy Star PCs and other small form-factor systems with its family of highly integrated graphics controllers. In addition, the company took advantage of capacity problems at its competitors.

Even Intel was constrained by its manufacturing plants, which have been bursting at the seams for five straight quarters. But despite the capacity crunch, the microprocessor giant dropped chip prices precipitously during the fourth quarter to stave off budding 486 suppliers AMD and Cyrix. AMD's flat sales echoed

Q4 and Year Total of 1993 and 1992 Net Income from Selected U.S.-Based IT Vendors ($M)

Net Income in Millions	Quarterly Q4 93	Quarterly Q4 92	% Change	Year Total 1993	Year Total 1992	% Change	Margin Q4 93 (%)	Margin Q4 92 (%)	Margin Total 1993 (%)	Margin Total 1992 (%)
Computer Systems										
Alpha Micro*	0.1	0.3	-55.9	0.8	(4.0)	n/a	1.1	2.4	1.9	-8.3
Amdahl	(40.9)	2.5	n/a	(580.0)	(7.0)	n/a	-9.2	0.3	-34.5	-0.3
Auspex	2.1	1.9	14.9	9.1	6.3	44.4	10.5	11.4	11.0	10.5
Concurrent	(3.5)	0.7	n/a	(40.9)	72.6	n/a	-8.6	1.3	-20.2	33.8
Control Data	2.5	10.0	-75.2	9.1	(134.0)	n/a	1.8	6.6	2.0	-26.0
Convex	(13.2)	0.9	n/a	(61.3)	2.8	n/a	-28.8	1.4	-31.7	1.2
Cray	24.3	(26.5)	n/a	60.9	(14.9)	n/a	8.0	-11.7	6.8	-1.9
Data General	(21.1)	0.8	n/a	(82.3)	(65.7)	n/a	-8.1	0.3	-7.8	-6.0
Digital	(72.1)	(73.9)	n/a	(72.3)	(2,500.8)	n/a	-2.2	-2.0	-0.5	-17.7
EMC	46.8	10.4	348.7	127.3	29.1	337.9	18.8	8.9	16.6	7.9
Hewlett-Packard*	368.0	261.0	41.0	1,284.0	840.0	52.9	6.5	5.7	6.0	4.9
IBM*	0.4	(5,463.0)	n/a	(8,272.6)	(4,965.0)	n/a	0.0	-27.9	-13.2	-7.7
Intergraph*	(69.9)	(2.0)	n/a	(116.1)	8.4	n/a	-26.0	-0.6	-11.1	0.7
NCR	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NetFrame	1.2	1.2	-1.0	7.2	3.2	122.3	36.0	27.3	10.8	8.3
Pyramid	0.6	0.5	35.7	8.8	(40.7)	n/a	14.7	-73.9	3.7	-20.6
Sequent	(15.1)	6.3	n/a	(7.5)	14.4	n/a	-14.5	7.1	-2.1	4.7
Sequoia	2.4	(19.6)	n/a	1.6	(34.0)	n/a	21.5	-178.8	3.9	-65.9
Silicon Graphics	36.3	22.0	65.3	119.2	(74.4)	n/a	9.8	8.1	9.4	-7.8
StorageTek	6.3	(10.0)	n/a	(54.7)	13.2	n/a	1.6	-2.4	-4.0	0.9
Stratus	(17.1)	17.2	n/a	16.6	56.9	-70.8	-11.5	12.7	3.2	11.7
Sun Microsystems	43.8	24.1	81.9	188.2	128.0	47.0	3.9	2.3	4.2	3.3
Tandem	24.9	17.5	42.2	(510.3)	70.9	n/a	5.2	3.6	-25.2	3.4
Tricord	4.1	0.5	672.5	9.0	(3.3)	n/a	14.2	4.7	11.2	-9.8
Unisys	117.7	139.2	-15.4	565.4	361.2	56.5	5.6	6.2	7.3	4.3
Wang*	4.9	0.4	1125.0	180.2	(406.2)	n/a	2.1	0.1	18.4	-24.7
Subtotal	**$433.7**	**($5,077.8)**	**n/a**	**($7,210.7)**	**($6,643.0)**	**8.5%**	**1.2%**	**-14.5%**	**-5.8%**	**-5.4%**

Q4 and Year Total of 1993 and 1992 Net Income from Selected U.S.-Based IT Vendors ($M)

Continued

Net Income in Millions	Quarterly Q4 93	Quarterly Q4 92	% Change	Year Total 1993	Year Total 1992	% Change	Margin Q4 93 (%)	Margin Q4 92 (%)	Margin Total 1993 (%)	Margin Total 1992 (%)
Personal Computers										
ALR	0.5	(1.8)	n/a	(8.3)	(1.7)	n/a	1.1	-4.3	-4.7	-0.9
Apple	40.0	161.3	-75.2	(34.7)	525.7	n/a	1.6	8.1	-0.4	7.3
AST Research	17.9	14.6	23.0	(49.8)	57.6	n/a	2.6	4.2	-2.5	5.1
Compaq	151.0	89.5	68.8	462.4	213.2	116.9	6.9	6.3	6.4	5.2
Dell*	17.7	31.3	-43.4	(35.8)	101.6	n/a	2.4	5.0	-1.2	5.0
Zeos	(3.0)	(7.2)	n/a	(12.1)	(28.2)	n/a	-6.5	-15.3	-5.6	-13.7
Subtotal	**$227.2**	**$294.8**	**-22.9%**	**$333.8**	**$896.3**	**-62.8%**	**3.7%**	**6.7%**	**1.6%**	**6.1%**
Storage										
Adaptec	(29.7)	4.4	n/a	(4.0)	33.6	n/a	-32.6	4.6	-2.3	19.6
Applied Magnetics	(6.2)	2.1	n/a	(52.1)	(23.1)	n/a	-8.8	2.9	-15.7	-8.0
Conner Periph	8.5	8.5	-0.4	(445.3)	121.1	n/a	1.5	1.4	-20.7	5.4
Exabyte	5.9	5.3	11.6	16.2	20.5	-21.0	7.1	7.5	5.2	7.1
Iomega	(17.0)	0.0	n/a	(14.5)	4.7	n/a	-45.3	0.1	-9.9	3.4
Komag	(29.7)	4.4	n/a	(9.9)	16.9	n/a	-32.6	4.6	-2.6	5.2
Maxtor	(121.3)	18.6	n/a	(272.8)	89.0	n/a	-38.1	4.6	-22.0	6.4
Micropolis	(6.0)	4.8	n/a	(19.9)	19.6	n/a	-6.6	5.2	-5.2	4.9
Quantum	6.1	28.0	-78.1	(9.6)	84.8	n/a	1.2	6.1	-0.5	5.5
Read Rite	(5.0)	17.2	n/a	(21.3)	55.4	n/a	-5.0	12.4	-4.8	12.0
Rexon	0.0	0.4	-99.3	(52.5)	9.4	n/a	0.0	0.9	-27.7	4.4
Seagate	42.7	63.3	-32.4	151.3	222.9	-32.1	5.2	8.1	4.9	7.2
Syquest	2.8	4.5	-37.8	13.5	16.6	-18.7	5.9	8.8	6.7	8.6
Western Digital	12.5	6.9	80.7	(28.8)	(3.5)	n/a	3.4	2.0	-2.3	-0.3
Subtotal	**($136.3)**	**$168.5**	**n/a**	**($749.8)**	**$667.6**	**n/a**	**-4.2%**	**5.1%**	**-6.1%**	**5.6%**

Q4 and Year Total of 1993 and 1992 Net Income from Selected U.S.-Based IT Vendors ($M)

Continued

Net Income in Millions	Quarterly Q4 93	Quarterly Q4 92	% Change	Year Total 1993	Year Total 1992	% Change	Margin Q4 93 (%)	Margin Q4 92 (%)	Margin Total 1993 (%)	Margin Total 1992 (%)
LAN Communications										
3Com*	21.5	9.3	131.3	71.0	16.5	329.3	10.5	6.1	10.2	3.2
Artisoft	3.1	3.4	-8.3	8.6	14.7	-41.6	14.6	14.1	10.7	16.8
Banyan	3.2	2.9	10.0	13.0	8.2	57.4	9.8	9.6	10.1	7.3
Cabletron*	31.2	22.1	40.9	110.1	75.5	45.9	19.9	20.0	19.9	20.0
ChipCom	4.5	2.5	84.2	15.0		10.3	8.9	10.0	0.0	
Cisco Systems	77.5	38.7	100.2	241.0	122.4	96.9	26.7	26.7	26.0	25.9
CrossComm	1.9	0.9	106.9	6.1	1.9	220.4	13.0	10.3	12.2	6.5
Lannet	2.0	2.9	-32.1	4.2	13.0	-67.9	13.6	23.4	8.4	27.9
Network General	4.8	3.4	41.8	13.2	10.3	28.2	16.7	13.6	13.3	13.0
Network Systems	(5.1)	(50.0)	n/a	2.2	(39.7)	n/a	-7.6	-84.8	1.0	-18.1
Novell*	72.8	70.9	2.7	293.1	253.9	15.4	23.4	27.2	25.2	26.7
Proteon	(13.7)	0.3	n/a	(19.3)	6.5	n/a	-66.9	0.8	-18.7	5.4
Retix	0.5	2.5	-81.3	(2.5)	8.0	n/a	2.7	12.9	-4.2	11.3
SMC*	5.4	4.3	27.1	18.7	14.0	33.6	6.1	6.6	6.3	5.9
SynOptics	23.8	16.9	40.6	76.9	42.4	81.2	12.6	12.9	10.9	10.9
Wellfleet	13.8	6.0	129.4	42.2	18.6	127.8	15.7	15.0	15.8	15.1
Xyplex	2.1	2.2	-3.7	8.8	7.8	13.7	10.3	12.6	11.5	13.3
Subtotal	**$249.2**	**$139.1**	**79.2%**	**$902.3**	**$574.2**	**57.1%**	**15.4%**	**12.0%**	**16.1%**	**14.4%**
Data Communications										
General DataCom	(2.0)	1.6	n/a	19.8	3.6	444.7%	-4.1	2.9	10.1	1.9
Microcom	0.3	0.4	-31.2	(13.0)	(6.1)	n/a	1.8	2.3	-23.5	-8.4
N.E.T.	0.3	1.2	-72.2	(17.7)	5.8	n/a	0.5	2.1	-7.8	2.7
Newbridge*	41.4	17.7	133.9	136.0	38.1	257.1	28.5	21.1	28.8	15.0
Stratacom	2.1	1.6	28.6	7.5	4.5	67.2	10.4	10.3	10.1	8.2
Telebit	2.3	(3.2)	n/a	(9.0)	(5.0)	n/a	9.8	-14.6	-11.2	-5.8
Tellabs	15.2	9.7	55.6	32.0	16.9	89.7	14.1	11.1	10.0	6.5
US Robotics	5.9	3.3	77.8	19.6	11.8	65.5	7.1	10.0	8.2	9.8
Subtotal	**$65.4**	**$32.3**	**102.5%**	**$175.2**	**$69.6**	**151.6%**	**13.0%**	**8.7%**	**10.5%**	**5.5%**

Q4 and Year Total of 1993 and 1992 Net Income from Selected U.S.-Based IT Vendors ($M)

Continued

Net Income in Millions	Quarterly Q4 93	Quarterly Q4 92	% Change	Year Total 1993	Year Total 1992	% Change	Margin Q4 93 (%)	Margin Q4 92 (%)	Margin Total 1993 (%)	Margin Total 1992 (%)
Software										
Application Solutions										
Adobe*	15.8	8.4	87.3	57.0	43.6	30.8	18.2	11.9	18.2	16.4
Aldus	4.7	1.9	141.2	9.5	6.8	40.4	8.1	4.2	4.6	3.9
American Software*	0.2	1.1	-80.7	(0.9)	8.0	-110.7	0.9	4.4	-0.9	7.3
Autodesk*	15.3	11.2	36.9	62.2	43.9	41.7	15.0	11.4	15.3	12.4
Broderbund*	6.2	4.9	27.9	15.0	11.2	34.7	19.0	15.0	15.7	13.0
Cadence Design	(1.0)	20.0	n/a	(12.8)	55.4	n/a	-1.0	17.1	-3.4	12.9
Consilium*	(1.1)	(1.7)	n/a	(3.1)	(6.2)	n/a	-15.3	-27.7	-10.7	-22.6
Data I/O	(9.9)	1.1	n/a	(11.9)	1.2	n/a	-66.6	6.1	-18.8	1.7
Electronic Arts	18.1	12.3	47.5	42.1	27.6	52.5	12.1	11.5	10.6	10.6
Frame	0.4	3.0	-87.1	(34.0)	5.8	n/a	2.6	12.3	-226.3	23.8
FileNet	4.0	(11.7)	n/a	7.7	(8.0)	n/a	8.7	-36.8	4.9	-5.8
HBO & Co.	6.3	5.4	17.3	18.3	13.1	39.9	9.7	8.8	7.7	6.5
Hogan Systems	1.7	1.6	1.0	5.4	4.7	14.8	8.9	9.5	8.3	7.2
Interleaf	0.4	3.0	-86.5	(5.7)	4.3	n/a	1.4	9.5	-5.0	3.7
Mentor Graphics	(29.6)	0.3	n/a	(32.1)	(50.9)	n/a	-35.3	0.4	-9.4	-14.5
PDA Engineering	0.5	1.2	-62.2	2.3	4.9	-52.1	4.3	10.7	5.6	12.1
Peoplesoft	4.8	8.4	-42.4	10.2	11.3	-9.7	15.3	14.5	14.6	14.3
Ross Systems	(7.0)	1.5	n/a	(4.5)	(2.2)	n/a	-40.5	6.4	-5.3	-2.8
SDRC	4.4	1.9	128.3	14.3	14.5	-1.4	8.1	4.2	7.7	8.9
Shared Medical Sys.	8.4	7.3	16.0	31.0	28.4	9.3	6.2	5.8	6.2	6.0
Software Pub.	0.4	4.1	-91.2	(38.0)	0.6	n/a	1.6	11.3	-42.0	0.4
Synopsys	4.4	2.4	83.2	11.0	6.0	84.0	12.9	11.3	13.9	11.6
Viewlogic	4.9	3.2	52.7	13.0	9.2	40.5	16.8	15.6	13.9	13.1
Subtotal	**$52.3**	**$90.9**	**-42.4%**	**$156.2**	**$233.0**	**-33.0%**	**13.3%**	**20.9%**	**3.85%**	**6.1%**

Q4 and Year Total of 1993 and 1992 Net Income from Selected U.S.-Based IT Vendors ($M)

Continued

Net Income in Millions	Quarterly Q4 93	Quarterly Q4 92	% Change	Year Total 1993	Year Total 1992	% Change	Margin Q4 93 (%)	Margin Q4 92 (%)	Margin Total 1993 (%)	Margin Total 1992 (%)
Application Tools										
Ask Computer	(13.7)	3.6	n/a	(16.4)	6.2	n/a	-13.6	3.2	-4.0	1.4
Bachman	(3.6)	(3.9)	n/a	(12.6)	(5.6)	n/a	-38.5	-40.6	-35.7	-12.4
Borland	0.4	(61.3)	n/a	14.5	(81.2)	n/a	0.4	-58.8	3.2	-17.5
Comshare	1.1	0.3	216.1	(1.1)	(11.6)	n/a	4.4	1.2	-1.1	-10.2
Easel Corp.	(6.2)	0.3	n/a	(8.9)	(2.8)	n/a	-94.1	3.8	-32.8	-8.4
Gupta	3.0	1.0	210.8	5.6	1.8	219.6	16.6	8.7	10.0	5.4
Information Resources	4.5	4.6	-2.6	24.1	19.2	25.1	5.0	6.0	7.2	7.0
Informix	18.1	15.2	18.5	53.2	47.8	11.2	17.8	15.9	15.1	16.8
Intellicorp	(0.3)	(1.6)	n/a	(2.5)	(7.0)	n/a	-9.4	-70.4	-20.7	-77.8
Intersolv*	1.5	1.5	3.0	(1.5)	5.8	n/a	7.5	7.0	-1.9	6.9
Knowledgeware	2.1	1.0	110.9	(23.9)	5.6	n/a	5.5	3.0	-17.3	4.5
Lotus	29.6	14.6	103.1	55.7	80.4	-30.7	10.6	5.9	5.7	8.9
Oracle*	62.1	33.5	85.5	197.8	45.5	334.5	13.7	9.5	11.7	3.5
Parametric Technology	14.6	8.3	76.4	49.3	25.5	92.8	27.3	25.4	26.8	24.9
Powersoft	2.8	2.2	29.1	8.1	3.5	128.0	14.3	26.9	15.8	16.7
Progress Software*	4.1	3.0	37.1	12.9	9.6	34.1	12.7	12.3	11.5	11.3
Sybase	17.8	10.7	66.5	44.1	23.6	86.7	12.9	12.9	10.3	8.9
Subtotal	**$137.8**	**$32.8**	**319.6%**	**$398.3**	**$166.5**	**139.2%**	**9.2%**	**2.6%**	**7.3%**	**3.6%**
Systems Software and Utilities										
BMC Software	23.1	17.3	33.8	81.2	46.2	75.8	30.6	26.5	29.6	20.4
Boole & Babbage	2.3	1.9	19.0	2.3	(22.1)	n/a	7.4	6.6	1.9	-19.7
Computer Associates	124.2	80.2	54.8	239.1	144.0	66.1	21.6	16.0	11.6	8.1
Legent Corp.	18.3	19.1	-3.9	59.7	34.2	74.2	16.0	16.3	13.6	7.7

Q4 and Year Total of 1993 and 1992 Net Income from Selected U.S.-Based IT Vendors ($M)

Continued

Net Income in Millions	Quarterly Q4 93	Quarterly Q4 92	% Change	Year Total 1993	Year Total 1992	% Change	Margin Q4 93 (%)	Margin Q4 92 (%)	Margin Total 1993 (%)	Margin Total 1992 (%)
Systems Software and Utilities *— continued*										
Microsoft	289.0	236.0	22.5	793.7	655.2	21.1	25.6	25.2	19.3	20.1
Phoenix Technology	1.2	1.0	17.3	7.3	6.7	9.9	5.3	5.5	9.1	9.3
Sterling Software	11.0	2.3	389.5	(20.5)	21.7	n/a	10.1	2.3	-5.7	6.5
Symantec	(9.2)	(11.5)	n/a	(14.6)	(19.5)	n/a	-13.7	-18.6	-13.7	-18.6
System Software*	1.2	0.9	33.3	(12.7)	16.3	n/a	1.8	1.9	-4.5	7.2
Subtotal	**$461.2**	**$347.2**	**32.8%**	**$1,135.6**	**$882.7**	**28.6%**	**51.9%**	**47.0%**	**14.3%**	**13.2%**
Subtotal w/ Novell	**$724.1**	**$541.8**	**33.6%**	**$1,983.2**	**$1,536.2**	**29.1%**	**14.0%**	**12.0%**	**10.6%**	**9.6%**
Software subtotal	**$651.3**	**$470.9**	**38.3%**	**$1,690.2**	**$1,282.2**	**31.8%**	**13.4%**	**11.1%**	**9.6%**	**8.5%**
Semiconductors/Components										
AMD	41.6	69.6	-40.1	228.8	245.0	-6.6	10.1	17.4	13.9	16.2
Analog Devices*	14.0	7.0	98.9	50.3	23.0	119.0	7.8	4.7	7.2	3.9
Chips & Techs.	0.7	(25.9)	n/a	(12.4)	(61.2)	n/a	3.2	-91.1	-14.3	-51.4
Cirrus Logic	19.8	7.3	171.1	32.5	22.1	47.1	13.2	7.3	6.8	7.2
Cypress	(4.1)	(23.7)	n/a	8.0	(21.0)	n/a	-4.9	-35.2	2.6	-7.7
Intel	594.0	429.0	38.5	2,294.9	1,067.0	115.1	24.9	23.1	26.1	18.3
LSI Logic	15.7	6.7	134.4	25.0	(110.2)	n/a	8.3	4.2	3.5	-17.8
Microcom	0.3	0.4	-31.2	(13.6)	(6.0)	n/a	1.8	2.3	-24.5	-8.3
Motorola	340.0	181.0	87.8	1,022.0	576.0	77.4	6.8	4.9	6.2	4.3
National Semi*	60.7	35.3	72.0	190.9	99.2	92.4	10.4	7.2	8.7	5.3
Texas Instruments	134.0	78.0	71.8	473.0	247.0	91.5	5.6	3.9	5.5	3.3
VLSI Tech	7.6	(25.4)	n/a	15.9	(32.2)	n/a	5.7	-22.2	3.1	-7.5
Subtotal	**$1,224.3**	**$739.2**	**65.6%**	**$4,315.4**	**$2,048.6**	**110.7%**	**10.6%**	**8.1%**	**10.6%**	**6.3%**

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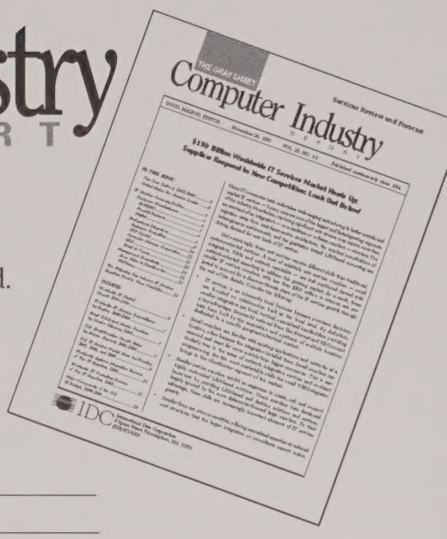

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Q4 and Year Total of 1993 and 1992 Net Income from Selected U.S.-Based IT Vendors ($M)

Continued

Net Income in Millions	Quarterly Q4 93	Quarterly Q4 92	% Change	Year Total 1993	Year Total 1992	% Change	Margin Q4 93 (%)	Margin Q4 92 (%)	Margin Total 1993 (%)	Margin Total 1992 (%)
Services										
ADP	80.2	70.1	14.3	313.5	272.1	15.2	13.9	13.5	13.4	13.1
Barrister Information Systems	0.0	0.0	775.0	(62.0)	(2.2)	n/a	-0.7	-0.1	-248.4	-8.5
CACI International	1.5	(0.2)	n/a	3.6	1.9	88.7	3.3	-0.5	2.3	1.3
Computer Sciences	21.7	18.8	15.2	66.0	59.6	10.8	3.5	3.1	2.6	2.4
EDS	202.9	178.0	14.0	545.9	478.4	14.1	8.8	8.3	6.4	5.8
Intermetrics*	0.4	0.3	13.1	1.6	1.5	9.1	2.7	2.4	2.9	2.5
Subtotal	**$306.6**	**$267.1**	**14.8%**	**$868.7**	**$811.3**	**7.1%**	**8.6%**	**8.0%**	**6.4%**	**6.2%**
Other										
Bolt Beranek & Newman	(1.7)	(25.1)	n/a	(10.9)	(20.6)	n/a	-3.4	-42.1	-5.2	-8.0
Comdisco	23.0	40.0	-42.5	66.0	11.0	500.0	4.3	7.0	3.1	0.5
CompUSA	(5.5)	3.0	n/a	1.6	9.9	-84.1	-1.0	0.9	0.1	0.9
InaCom	3.1	3.9	-20.3	12.6	10.7	17.6	0.7	1.4	0.8	1.1
Key Tronic	(2.3)	1.4	n/a	6.3	(2.4)	n/a	-5.6	4.4	4.7	-1.8
MicroAge	4.5	1.8	158.0	13.3	5.1	158.8	1.0	0.5	0.8	0.5
QMS	(0.4)	1.4	n/a	(5.1)	(1.9)	n/a	-0.5	1.8	-1.8	-0.7
Qume*	(8.5)	(1.9)	n/a	(17.8)	(8.8)	n/a	-57.2	-7.7	-26.6	-6.2
Tektronix*	11.5	8.4	35.8	(51.8)	21.2	n/a	3.6	2.5	-4.1	1.6
Subtotal	**$23.7**	**$32.8**	**-27.8%**	**$14.2**	**$24.2**	**-41.2%**	**1.0%**	**1.6%**	**0.2%**	**0.3%**
Total	**$3,045.0**	**($2,932.9)**	**n/a**	**$339.2**	**($268.9)**	**n/a**	**4.4%**	**-4.7%**	**0.1%**	**-0.1%**

**All results represent Q4 94 ending December 31, 1993 except for: 3Com, Cabletron, Intermetrics, Progress Software, SMC, Qume, Alpha Micro, Broderbund Q4 ending November 30; Tektronix Q4 ending November 27; Adobe Q4 ending November 26; Comdisco Q493 reflects a $20 million change in accounting principle; Intergraph includes a $75.7 M pre-tax restructuring charge; Analog Devices, National Semi Q4 ending Oct.30; Newbridge, MicroAge, Novell, System Software, Consilium, American Software Q4 93 ending January 30. NCR post tax operating income was approximately- $60M including restructuring charges of $120M after taxes; Dell Q4 is based on a consensus estimate.*

Source: International Data Corporation, 1994

that company's manufacturing shortfall as well.

Of the companies in this section of the database, Texas Instruments was the prime beneficiary of inflated DRAM prices, which have been up since the explosion in July at a key materials supplier for chip packages. TI, the largest U.S. DRAM supplier, also cashed in on the continuing shortage of standard-logic chips, as did National Semi and Motorola.

Looking ahead, IDC expects demand to temper somewhat from 1993, although the ongoing capacity problem should keep prices — as well as revenues and profits — respectable. Intel in particular is poised to take advantage of others' manufacturing woes, as it ramps DX4s and faster Pentiums on massive new 0.6 micron plants. On the other hand, its rival, AMD, has identified some options for expanding manufacturing in the future, but acknowledges that growth will be restricted for much of 1994.

Expect Cirrus Logic to have trouble maintaining its impressive sales and margin growth into 1994 as other graphics competitors gun for the leader. With so many fabless graphics chip companies, though, the ongoing manufacturing crunch may play as big a role in the brewing rumble as price or features. In that respect, Cirrus may have gotten a leg up on competitors last year when it inked a deal for exclusive use of a non-utilized IBM plant.

Services

The established large, public-services-only vendors based in the United States tended to underperform the overall services market in 1993 for several reasons:

- They have generally specialized in government, noncommercial business, and often lose bids in the much faster growing commercial market to systems vendors like IBM.
- A lot of the hottest areas for revenue growth in professional services have been in consulting rather than SI, outsourcing, and application development, the categories where the services-only vendors have tended to specialize. They are attempting to leverage their position in these markets into more consulting, but with only mixed success.
- Revenue growth can be bumpy when a number of long-term contracts end at the same time. New business was actually pretty good in 1993; several of these vendors were paying the price for insufficient new wins in 1991 and 1992 to compensate for contracts that expired last year.

Only the last point is grounds for optimism on revenue in 1994, as last year's new contracts start to provide some kick. However, the first two bullets will continue to set a ceiling on the opportunities of these vendors in contrast to competitors like IBM and Andersen.

On the income side of the ledger, these companies survive by watching costs, and frankly have a more manageable (because more predictable) job of it than IT product manufacturers. They therefore continue to show good, even improving, margins on relatively low revenue growth.

Even so, outsourcing poses long-term issues for margins. After all, users are sending the business out precisely because of weak cost/benefit ratios. Some of the smaller players in outsourcing, the ones that win by underbidding, are already finding that making a profit on users' castoffs is a lot dicier than they had thought. IDC anticipates that more and more of the new outsourcing business over the next couple of years will fall into this category.

Prospects

In IDC's view, we have just completed the second year of a three-year cycle. For the remainder of 1994, it should be reasonable to extrapolate from trends in 1993:

- IT business in the U.S. market will continue to outperform computer-related sales in other established economies.
- Vendors based in the United States will continue to gain share from their international competitors.
- PC unit growth will provide strong revenue opportunities, but for the most part success will accrue to a handful of manufacturers.
- LAN and chip vendors will share in the spoils of the unit PC growth.
- Software will continue its transition to a new generation of products at new pricing levels.

The exceptions to this scenario are storage, where the cycles are running in months rather than years, and systems and services, where the trends that began in the mid-1980s will take about a decade to play themselves out.

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DOUG McLEOD, EDITOR | March 25, 1994 | VOL. 29, NO. 10 | Published continuously since 1964.

Olivetti's Emphasis on PCs, Services, and Telecommunications Provide Short-Term Relief and May Drive a Turnaround: Long-Term Challenges Remain

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The recent award of Italy's second cellular license to an Olivetti-led consortium of international suppliers demonstrates the Italian company's long-term diversification strategy. Olivetti is looking for increasing revenue from a variety of nontraditional IT services. The win will provide that and more, including a visible reminder that Olivetti can indeed compete and succeed in new markets.

However, Olivetti still faces several significant challenges. It is making the best of a bad situation. The European economy is stagnant; Italy's politics are in a state of turmoil. The company is hampered by government policy dictating employment levels that limit the speed at which Olivetti can rightsize. The slide in the value of the Italian lira meant that overall worldwide sales showed an increase, but in real terms were again off, in 1993. Further, Olivetti still faces the long-term problems that have troubled it for years: a muddled product set and overall strategy that is rooted in the past.

Thanks to reorganization administered by new management and more effective cost containment, however, Olivetti will operate in 1994 at near breakeven. Olivetti is beginning to address the longer-term strategic problems. Its 1993 revenues increased 7.3%, from $5.1 billion to $5.5 billion. Losses in 1993 were narrowed to L300 billion (or $176 million). The company's debt has been decreased to one-third of equity, down from one-half at the end of 1992. PC sales are climbing and are now a far greater contributor to Olivetti's bottom line than are system sales. Margins in 1994 will expand, thanks to increasing services sales. Despite the persistence of the company's long-term challenges, we note the following positive changes at Olivetti:

- **Fewer products.** Olivetti no longer sells MIPS systems. Pyramid, NetFrame and Stratus are sold only to selected customers. The company's system strategy focuses on Unix-based Intel and Digital's Alpha-based products. Whereas this choice is certainly not beyond reproach, Olivetti can no longer be faulted for selling too many platforms and supporting them all poorly.
- **Services transition.** Olivetti is moving from a break/fix-services focus to systems-integration and professional-services focus in its services business. Remedial services remain a harvestable business line that is funding expansion into higher value-chain activities.

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- **Lower head count.** Olivetti's total worldwide labor force has been reduced by 25% in the last 30 months. This bodes well for the company's ability to offer products and services at competitive rates. In fact, management would like to proceed with the staff reductions slightly faster. In an age when Olivetti's most significant competition comes from companies that do not feel the paternalistic need to retain full employment, the alternative is continued huge losses.
- **PC focus.** Olivetti is doing what it does best, and that is PCs. It is the dominant PC supplier in Italy, where unit sales grew by 30% in 1993. PC unit growth is even faster outside Italy: 45% in 1993.
- **Slimmer organizational structure.** Most notable among the many organizational changes at Olivetti over the past three years has been the increasing freedom granted to front-line services assets. Olivetti's third-party maintenance operation is profitable, and its systems integration unit has been growing.
- **Vertical market economies of scale.** Olivetti is focusing its software and systems integration problem-solving expertise in three vertical markets (banking, public administration and retail/distribution) that share one key attribute. As a result, Olivetti can focus its significant development resources on a relatively small spectrum of IT products (middleware and applications in distributed, end-user environments).

The good news is that Olivetti management expects the company to break even in 1994. The return might have come more quickly had either the Italian government or the Italian economy cooperated. They have not. Flat forecasts for the next 12 months do nothing to brighten the outlook.

However, Olivetti's new management does deserve credit for addressing the company's existing fundamental weaknesses, even though it has made only limited progress to date. Management has moved to restore competitiveness in Olivetti's traditional businesses and to expand into new markets. Both will be important components to Olivetti's ultimate turnaround. Unlike past management, the current group appears to have a solid understanding of the dilemma, even if it also understands that there is little it can do to remedy the situation.

What will the company need? Restoring Olivetti to profitability and growth will be an uphill battle. The moribund European economic situation has done nothing to simplify Olivetti's turnaround. Approximately 35% of the company's revenue is generated inside Italy. And Italy's economic picture of late has not been particularly encouraging. What's worse, Olivetti cannot expect much growth from the rest of Europe, either. The lack of economic growth in European countries outside Italy (which represent another 44% of Olivetti's revenue) has been a primary contributor to its lackluster performance.

In addition, the company must contend with several major product challenges. On the hardware side of its business, Olivetti is just beginning to target the profitable and expanding market in PC LAN servers. The new SNX line is Olivetti's answer to products that hot companies like HP offer. Despite Digital's equity position, Olivetti's emphasis on Alpha AXP will not yield any returns in the immediate future.

Perhaps more important, PC margins are getting thinner every day. Although Olivetti's PC strategy appears sound, even an aggressive and solid strategy in a market characterized by such high levels of competition can fail. The company needs aggressive expansion of channels in- and outside Italy to drive volume in order to compete at the low-margin levels.

On the software side, Olivetti's technology emphasis is misaligned with market realities. For example,

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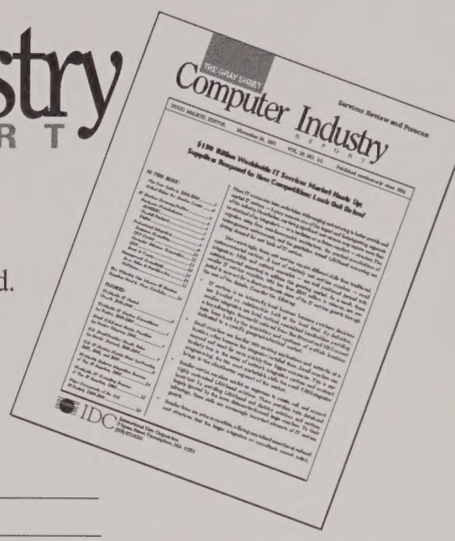

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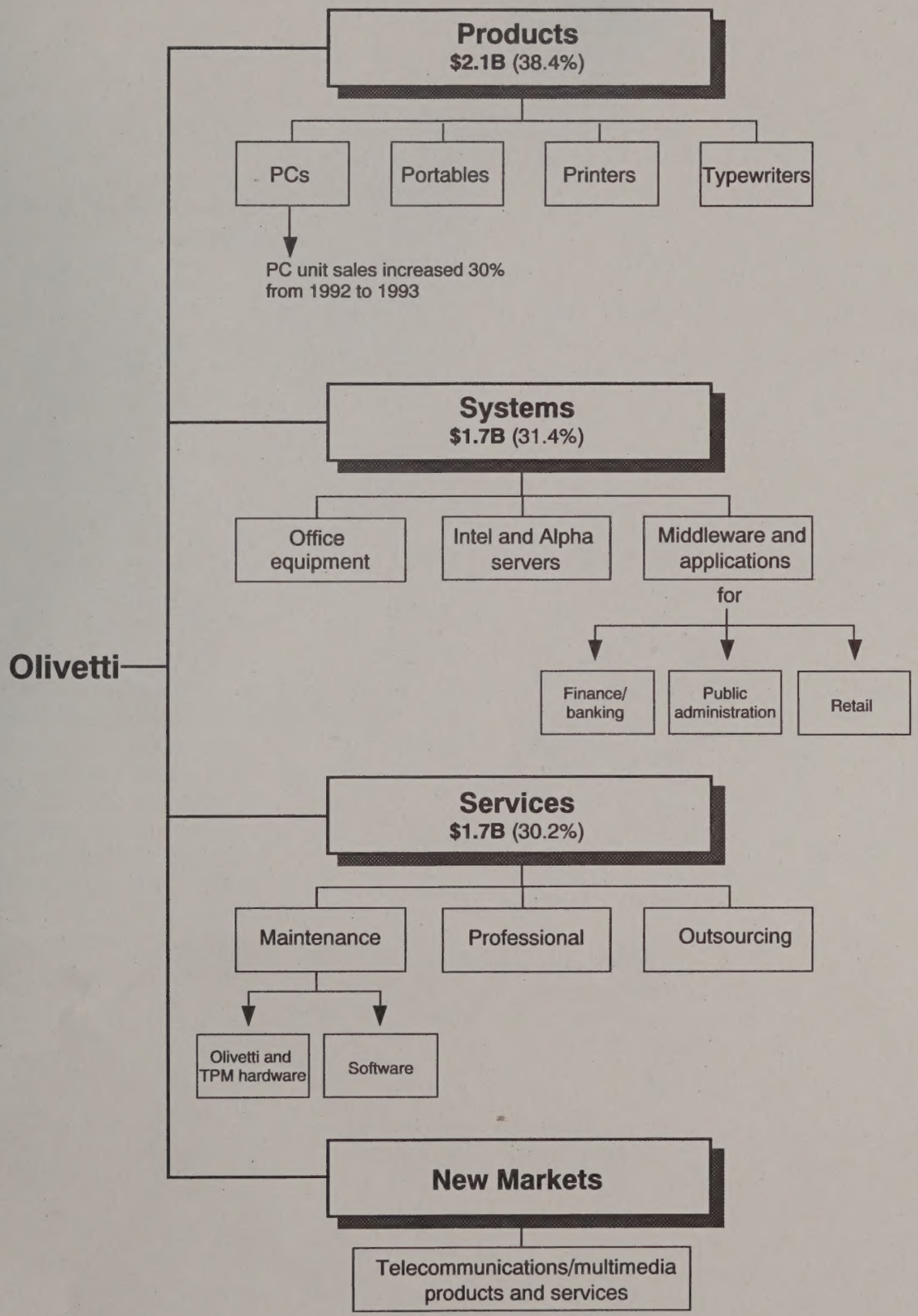
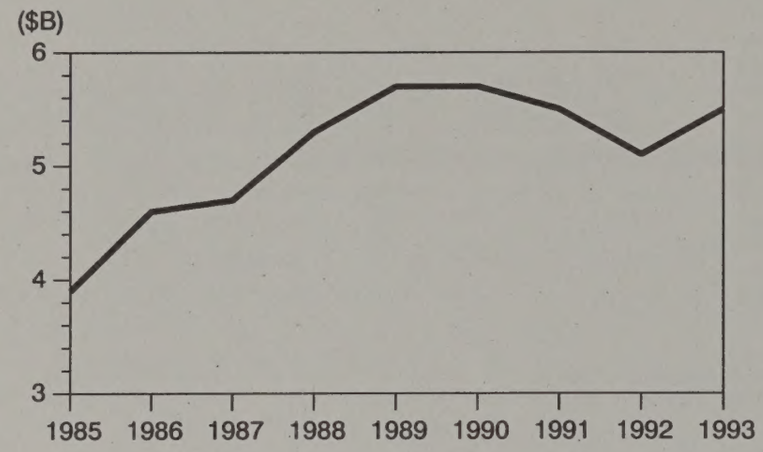
Olivetti Organizational Chart and 1993 Revenue by Segment



Note: Values are shown at 1993 average exchange rate.

Source: Olivetti and International Data Corporation, 1994

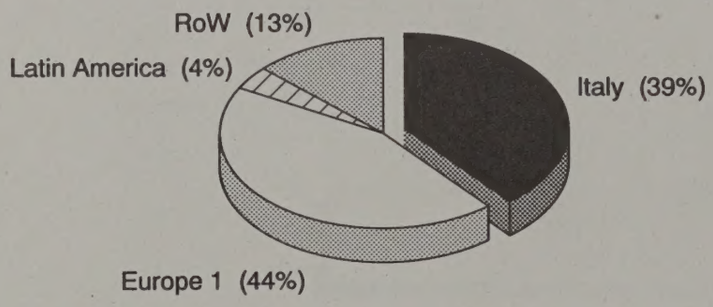
Olivetti Revenue, 1985–1993 ($B)



Note: Values are shown at 1993 average exchange rate.

Source: Olivetti, 1994

Olivetti 1993 Revenue by Geography ($B)



Total revenue = $5.5B

Note: Europe 1 includes France, Germany, and the United Kingdom.
Values are shown at 1993 average exchange rate.

Source: Olivetti, 1994

Olivetti's infatuation with NT belies NetWare's popularity. NetWare remains hugely successful in Europe, and Olivetti is a NetWare distributor. However, Olivetti seems to sell NetWare only reluctantly. As a result, it has had only limited success. This lukewarm support may affect Olivetti's ability to expand distribution channels.

Olivetti is attempting to expand its core business as well, with steady moves into multimedia and telecom markets. Its successful bid, along with its major partners (Bell Atlantic, Cellular Communication, Telia, Lehman Brothers, Pacific Telesis, and Mannesmann) for Italy's second cellular license has great implications. Olivetti's bid received a big boost when a competing partnership (containing Germany's Mannesmann and the U.S.'s Pacific Telesis) joined the Olivetti coalition. The cellular license will stimulate its nascent Telecommunications Division. That, in turn, will increase the company's confidence as it becomes a player in the European wireless market.

Strong PC Offering, but Is It Olivetti's Salvation?

Olivetti's line of PC products is among the widest and deepest of the worldwide PC suppliers. Olivetti is certainly the richest of any European supplier and perhaps any non-U.S. supplier (with the possible exceptions of Acer and Toshiba). In 1993, Olivetti shipped 833,600 PCs. The company continues to demonstrate design strength, but questions about the cost competitiveness of an Italy-based manufacturer remain.

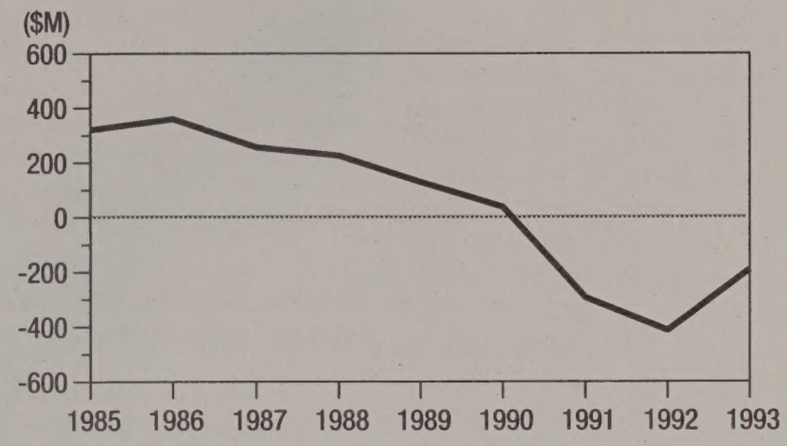
Olivetti enjoys a 24.0% share of the PC market in Italy. IBM has slightly less. Other suppliers are battling for the number three position with no strong leader yet to emerge. Outside Italy is another story completely. Olivetti has no more than a 6.0% share of any other country's PC market, except for Spain (10.9%), Denmark (11.2%), and Belgium (6.7%). But because Olivetti competes in almost every country, its Europe-wide numbers are fairly strong. It held approximately 8.4% of European shipments and 4.9% of their value in 1993.

Olivetti's PCs demonstrate the company's design strengths. However, it may be caught in brand-management hysteria. The company's six brands are aimed at different segments of the PC market, but some segments overlap. It is likely that eventually two or three of the brands will be subsumed by another brand as the lines between segments blur further. For

example, the "price-driven" market, the small office/home office market, and the home/individual markets may not need three different lines of PCs forever.

More important, as worldwide margins drop, Olivetti faces the need to drive unit sales even higher. Unit sales slightly outgrew the worldwide unit growth rate in 1993, but Olivetti remains far down the market-share list, with a little over 2% of worldwide share. As its competitors manufacture and sell as many as eight times as many PCs, Olivetti's prices will seem increasingly out of line, even despite the cost controls mandated from headquarters in Ivrea. The core questions: can Olivetti balance Italian design with low-cost manufacturing to maintain a profitable PC business against larger and less expensive competitors?

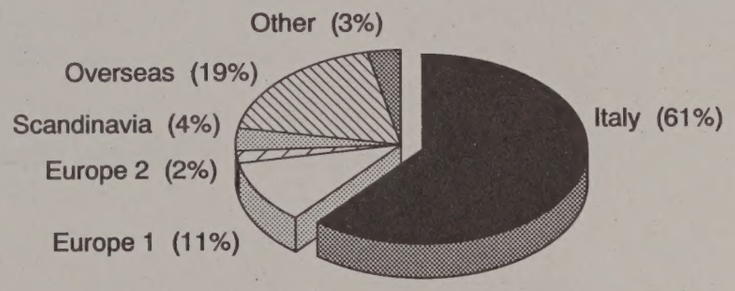
Olivetti Net Income, 1985–1993 ($M)



Note: Values are shown at 1993 average exchange rate.

Source: Olivetti, 1994

Olivetti 1993 Systems Integration Revenue by Geography ($M)



Total revenue = $216.5M

Note: Europe 1 includes France, Germany, and the United Kingdom; Europe 2 includes all other European countries.
Systems integration revenues above do not include hardware.
Values are shown at 1993 average exchange rate.

Source: Olivetti, 1994

Multiuser Systems: Another Server Strategy?

Olivetti's multiuser systems business is a bit more complex. Its overall commitment to its various systems suppliers (which still include Stratus and NetFrame) is questionable. Because it began shipping late in the year, Olivetti sold only several hundred Alpha-based systems in 1993.

Including all multiuser systems, Olivetti's share of 1993 Western European small-scale markets was only 2.1%, medium-scale only 1.1%.

Despite the announcement of the strong SNX server line (PCI-based Intel 486 and Pentium systems), PC LAN servers are falling through the gaps in Olivetti's otherwise solid organizational structure. The problem appears to be that the product group handles manufacturing and PCs (and also servers), but the systems group (which largely handles the distribution of OEM'd multiuser systems from Digital, NetFrame, and Stratus) designs the server products. The result: confusion at the high end of the PC market, and lack of an effective server-only distribution strategy.

Olivetti needs to adjust its server strategy. It would do well to determine the strategic importance of a server business that is more focused than the current strategy. Evaluating it as just an extension of the PC business is dangerously shortsighted. If Olivetti feels it can compete making and selling servers, then it should establish a more independent unit to do so.

A NetWare, Unix, and NT Reseller

At first glance Olivetti seems to be placing too much emphasis on NT. Although NT represents interesting technology for servers, it will be years before it attains any other status than an OS/2 competitor in large corporate accounts. More important, NT has no installed base to sell into. The unpcoming "Chicago" release is the logical upgrade for current Microsoft Windows clients, not NT. However, Olivetti's NT strategy is correctly focused on a specific vertical market, branch banking, where its robust application server functionality is desirable.

Nonetheless, NT may seem to Olivetti like a simpler option than its bifurcated Unix story. It sells USL SVR4 and SCO Unix (now considered "nonstrategic" by Olivetti).

All of the wrangling serves to divert attention from NetWare. It dominates the LAN OS market and has huge potential in Europe; Olivetti is a distributor. A lack of focus and too little marketing or service planning for NetWare have prevented Olivetti from much success with it.

Vertical Markets, Services, and SI: Olivetti's Future

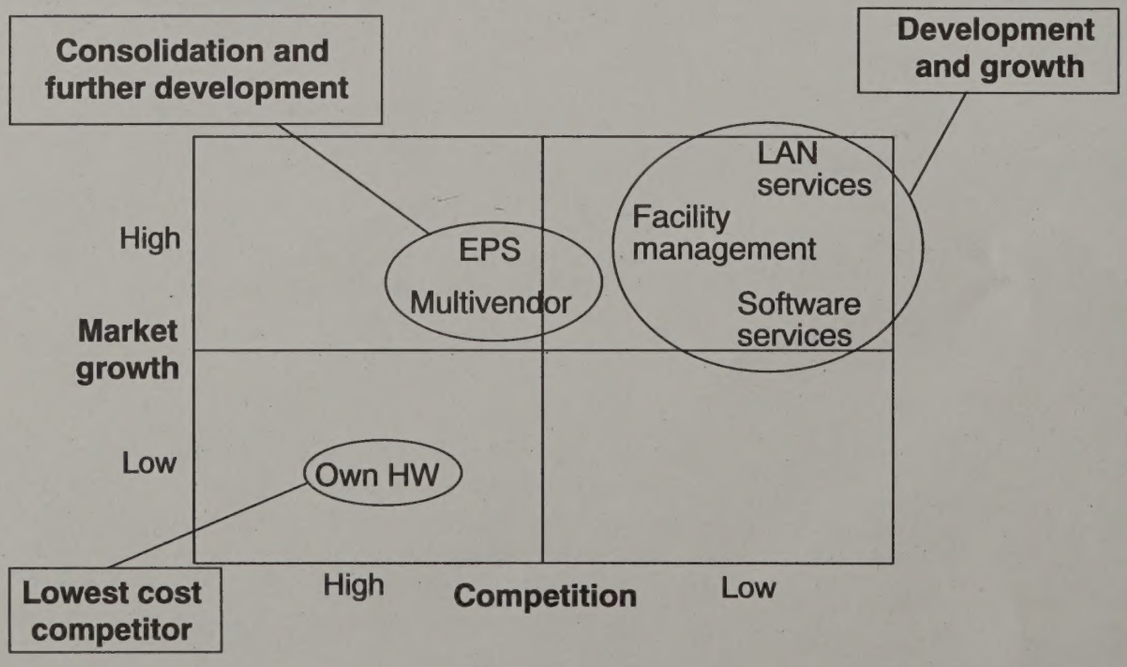
Olivetti's services businesses are increasingly important. They accounted for 30% of revenue in 1993 and will in management's view be instrumental in the drive to break even in 1994.

At the center of Olivetti's services strategy is the decision to drive a higher level of value-add through the services infrastructure. That means harvesting the break/repair business while investing in new personnel with new skills.

Olivetti sells services through both the systems group and the services organization. The systems group is responsible for solution selling in Olivetti's three key vertical markets. The services organization sells professional and outsourcing services to any and all customers. This leads to some overlap and may lead to some conflict in the future as well.

The increasing emphasis placed on overall services revenue will most likely exacerbate these tensions. Most of Olivetti's services competitors are already organized along customer lines. Olivetti may feel competitive pressure to extend the vertical market orientation of its systems group to the services group. If (more likely when) that happens, the company will need to rethink its entire vertical market organizational structure.

Olivetti Services Division Strategy



Olivetti is in the process of a transition in its services business. It is entering emerging markets (upper right), which will require a different kind of strategy than its more traditional services business (left).

Source: Olivetti, 1994

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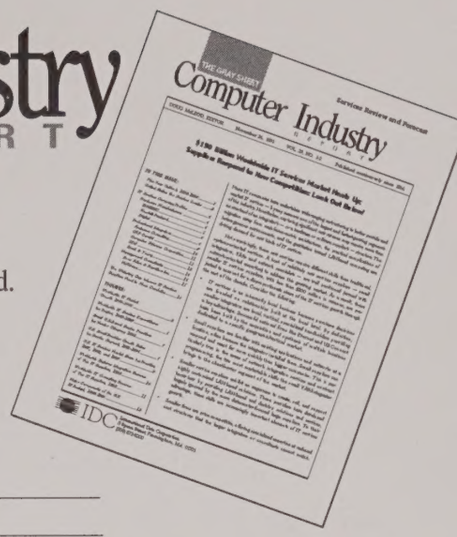

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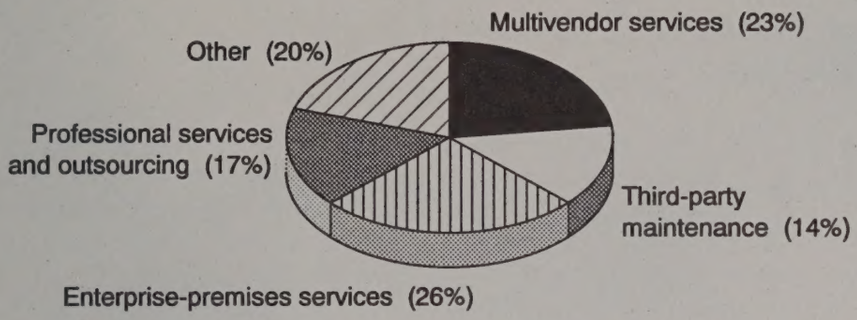
Olivetti Services Revenues by Type of Service, 1993 ($B)



Total revenue = $1.7B

Note: Olivetti hardware maintenance not included.
Values are shown at 1993 average exchange rate.

Source: Olivetti, 1994

A Partial Listing of Olivetti Products and Architectures

Operating systems	Microsoft NT and Windows USL's Unix System V Release 4 SCO Unix Stratus' FTX and VOS
Multiuser systems	Digital Alpha AXP Olivetti's SNX and LSX (Intel) Stratus NetFrame
Strategic DBMSs	Oracle and Informix
Transaction monitor	USL's Tuxedo
SMP systems	LSX 6500 (Pyramid's MIServer) LSX5000 (1–4 Pentium CPUs)
High-end PC line	M400 (based on Intel 486 processors)
PC LAN server	SNX (Intel-based uniprocessor)
PC LAN	Novell NetWare Microsoft Windows NT Advance Server
Printers	JP Line (Cannon ink jet)

Source: International Data Corporation, 1994

New Markets

Olivetti's current mix of businesses may not be enough to return it to profitability. Margins for PCs and servers are small and getting smaller. Olivetti will likely never capture the volumes necessary to drive overall profitability to acceptable levels. Software and services margins are certainly higher, but they remain a relatively small part of Olivetti's income. In addition, Olivetti's access to software and services markets outside Italy is limited.

However, Olivetti is addressing this problem. It is investing in a variety of new products that have the potential to provide significant new revenue streams. Olivetti's investments in Italy's second cellular license should boost its confidence. In addition, the company has a range of development efforts, including personal communicators and small mobile computers that challenge the current notion of information technology.

Olivetti has some particular advantages here. Research and development of impressive new designs and technologies have, in fact, never been a problem at Olivetti. For example, it has been a leader in producing subnotebook PC designs. Its first PCs were widely regarded as design leaders.

Management expects that a host of new investments will pay off in the multimedia future to drive a new era of prosperity in Ivrea. Some of the new technologies are indeed impressive. On their own, they are solid accomplishments.

However, to obtain the best return on these investments, Olivetti faces a familiar problem: Can they be sold to a worldwide, or at least European-wide, market? That has been the traditional stumbling block for some of Olivetti's impressive designs in the past. It remains so for the newest of the new and exciting technologies under development at Olivetti. If Olivetti can learn from these lessons, and more effectively partner with other international players, it may have a great opportunity. Its relationship with AT&T (and with AT&T's multimedia partners) for personal communicator products is encouraging.

Olivetti Is Not the Only European IT Supplier That Needs Reengineering

European computer makers remain stuck between their traditional role and the increasingly cutthroat European and worldwide IT market. So far only ICL can claim to have made the shift into a more pragmatic strategy, and it has recently reported sharply lower profits. Not surprisingly, only ICL feels no government pressure to maintain specific employment levels, or offer a specific product set. Still, not even ICL can claim to have turned the corner.

European IT suppliers' problems are at least twofold. They (Bull, ICL, Olivetti, and SNI) are paying the price for business models that have changed only slightly in over a decade. All four major European suppliers have traditionally competed in almost the entire length of the IT industry value chain, from chips to services. As the industry has adopted a model of much more intense competition at each layer of the chain, they have been slow to respond.

But their problems are not solely of their own making. Olivetti, SNI, and Bull are also paying for the shortsighted expectations placed upon them by their governments. They are expected to maintain specific employment levels in order to contribute to economic growth. As their America- and Asia-based competitors downsize operations, reduce overhead, and focus their product offerings, the Europeans appear increasingly isolated in the full-product-line strategies.

What's more, the poor economic picture in Europe makes it all worse. None of the four can truly claim to be a global IT supplier. All are bound by the fortunes of the European economy. And it has been in the tank.

Olivetti's managing director, Corrado Passera, bluntly states that his company cannot afford to wait for the economy to get better in Italy and Europe. Olivetti itself has to get better. This is perhaps the most encouraging comment that Olivetti's stockholders and employees could hear.

Mr. Passera understands, apparently, just how different selling IT products today is from selling office equipment in the past. He has moved quickly to establish a more streamlined structure; he has reduced head count and increased the focus on the PC business. He has clearly placed services as the key component for the new Olivetti. None of this will be easy. But there are few alternatives, none any more attractive.

Olivetti's boss has even talked of — and committed resources to — diversification. Olivetti is spending precious R&D resources on new products in new businesses. The company discusses the difficulty and importance of building leadership positions in new industry and even *creating* new segments of the traditional IT industry.

These kinds of changes are far different than cost containment. But they bring up a series of crucial questions. Can Olivetti compete with the hot companies? In which markets? How? And, can the rest of the company follow management?

These are the kinds of questions that a company in Olivetti's position should be asking, even though the answers are not simply optimistic. Mr. Passera is wise to be talking of leadership and new technologies. He is leading Olivetti into cellular and wireless data communication markets. They are perhaps the greatest hope for restoring Olivetti to the levels of profitability and prestige it held in the past.

THE GRAY SHEET
Computer Industry REPORT

Published continuously since 1964.

Thirty Years of Change, Part II:

A Review of Analysis and Comment from *The Gray Sheet's* Archives

A review of *The Gray Sheet's* 30 years of predicting, leading, and following the twists and turns of the EDP-computer-IT industry is a fascinating tour. In 30 years the industry has grown one hundredfold from under $4 billion in annual user spending to a projected $400 billion this year. The number of companies making computers, software, and computer components has grown from a dozen to many thousands.

The computer industry has become, in terms of employment and productivity, one of the most important sectors of the worldwide economy. It has injected more sheer wealth and vitality into the worldwide economy than any comparable industrial sector. And it has outgrown, and continues to outgrow, nearly every other sector of the economy — often by a startling margin.

Perhaps even more startling is the degree to which the computer revolution is a people's revolution. In 1964 computers were only beginning to touch people's lives . . . and then in only very oblique ways. They were used by a select group of highly trained professionals numbering only approximately 140,000. By 1971 the number was up to one million people — most of them still using centralized IBM systems.

In 1978, when the first PCs were developed, about seven million people around the world were directly involved with computers. By 1985, 50 million people around the world were using computers, and now approximately 450 million people around the world are involved with or use computers in some capacity.

In an effort to summarize some of the changes *The Gray Sheet* has witnessed, we have undertaken a brief review of the 700 issues of this newsletter. Throughout this exercise we have noted the consistency with which certain themes appear:

- Architectural life cycles and technological replacement. In 1964 IBM was poised to release a major new hardware line, the S/360, that was largely incompatible with its previous products. Balancing existing, profitable lines of business with threatening new technology remains one of the most daunting management challenges. Failure to do so has led to the decline of dozens of seemingly invincible hardware and software companies.

April 15, 1994 Vol. 29, No. 11

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- The need to protect IT investments. In 1976 Digital Equipment Corp. rolled out a series of new systems that allowed users to scale software development investments further than ever. Today, a fundamental attractiveness of client/server architectures is their likely scalability.
- Establishing value for nonhardware products. In 1967 the industry was struggling with the problem of how to get customers to attach value to intangible products like software and service. Pricing information, services, and intellectual property remains one of the industry's most significant challenges.

Plus ca change, plus la meme . . . or, the more things change, the more they stay the same. Even in the industry that cannot stand still. Despite the inexorable march of technology, the challenges of making, selling, and using IT products have remained surprisingly constant over 30 years.

Sometimes the rapid-fire pace of technological change obscures that consistency. In the rush to embrace new visions of a multimedia world, and as spending on new IT products rises, there is much to be learned from a quick look backward. As the industry enters a period of, potentially, even greater change than ever before, balancing pragmatism with zealous excitement becomes harder and harder. Perhaps the comments in the following pages about a variety of new paradigms, business models, products, and eras from the past 30 years will help to put the challenges at hand in a better light.

The following excerpts are reprinted exactly as they originally appeared in *The Gray Sheet*. Where context or background are necessary, we have added comments. Some excerpts have been bridged with ellipses (. . .). Enjoy. Congratulations. And good luck.

March 23, 1964 — Volume 1, Number 1

Unofficial estimates given to us by a marketing spokesman at IBM's Data Processing Division indicate that IBM expects to install 5,000 units of its as yet unannounced new computer series in the next five years.

In fact, over 25,000 S/360 systems were in use by April, 1969 . . . !

April 15, 1964

One of the most attractive features of the System/360 to users may prove to be a major competitive handicap to IBM, i.e., the basic instruction set that operates on all System/360 processors. This offers other hardware manufacturers the opportunity to develop a series of computers designed to utilize the same or a similar set of instruction codes and therefore benefit from the massive programming library that IBM is developing for the System/360. Without having to bear the sizable expense of developing a comprehensive software package for its computers, a manufacturer offering a computer with the same instruction set as the System/360 might well find that he could price his machine considerably under equivalent models of the System/360.

When you're responsible for understanding the intricacies of the global computer industry's maturation and growth IDC's ***Computer Industry Report*** *is the most reliable source of information and analysis you can find.*

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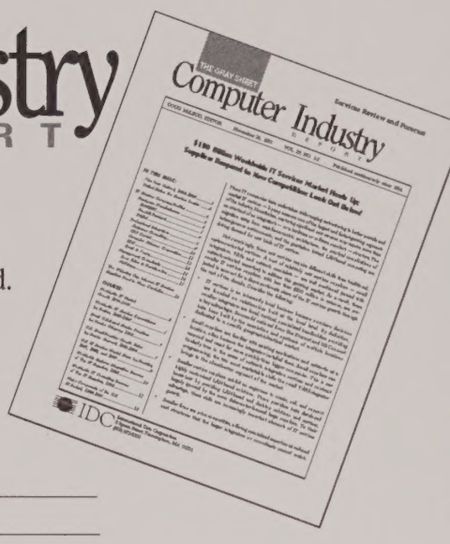

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Volume 29, Number 11

April 30, 1964

DEC unwrapped its newest computer, the PDP-7, at the recent SJCC . . . the computer features a 1.75 usec. memory cycle time and 4.4 usec. multiply time for about $72,000 (18-bit word, 8K core). It should be a strong competitor in the small scientific computer market . . .

July 15, 1964

An innovation in solving shortage of programming manpower during major system development work at computer installations is being offered by a new firm, DATAtemp Inc. of New York City. They maintain a staff of experienced programmers who are available on a daily or monthly basis. With over 1,000 computers in the New York City area, and frequent "crash" programming jobs in progress, the service sounds like a bright idea.

September 28, 1964

The future continues to look positive for DEC, and there has been considerable speculation about the possibility of a public offering of DEC stock. Although DEC President Kenneth B. Olsen has publicly expressed several times a distaste for selling stock to the public, we have learned that the company is preparing to publish publicly for the first time an annual report, which should be available by mid-October. This suggests that those who are anxious to invest in DEC may well have the opportunity to do so by mid-1965.

1964

Incompatibility among computers has resulted in needless duplication, delay, and waste — both to the manufacturer and the user — in terms of cost, in equipment, in operating efficiency, and in manpower and skill.

June 15, 1966

Approximately 58% of all computer systems currently on order are members of IBM's S/360 series, according to an analysis of the latest EDP/I&MR Monthly Computer Census.

How would you rate IBM's software and programming support in light of your expectations for it? . . .

Four of five [S/360-20] users questioned rated software as "excellent" or "very good." Some sample comments include: "As far as software is concerned, they're (IBM) in a prehistoric time." In speaking of the delay for PL/1, one user stated that he had given up waiting for it and now he doesn't really care when it is made available.

July 28, 1966

IBM's share of the total U.S. computer market declined just over a percentage point during 1965, dropping from 75.0 to 73.7% by year's end.

September 15, 1966

Twenty-two USSR-made MINSK 2/22 digital computers are being shipped to Czechoslovakia this year. However, the software promised with the systems has not been completed on schedule and is not available. So the Czech importer managed to wrestle a 28% discount from the Soviets in the price of the equipment. Many a U.S. user wishes he could do as well in a similar situation.

1966

This year confirms that a firm doesn't have to have the most advanced computers in order to capture a profitable share of the market.

March 15, 1967

That long-awaited phenomenon — packaged, off-the-shelf software — is finally emerging as a commercial reality in the computer marketplace.

Later, same issue:

Few if any people in the computer industry really know how to evaluate and justify software. It is, therefore, difficult for

the seller to price his wares and hard for the potential user to justify them. In most cases management has traditionally considered software a no-cost item and cannot yet see why it should buy it. The problem, thus, is one of education; time and exposure may prove to be the best teacher in many cases.

October 31, 1967

In the stock market lately, with so many investors eager to overbid for computer-sounding issues, there are many examples of remarkable stock performance, especially among the rash of new issues. Some of the rapid rises have been based largely on whim, some on undersupply, some on realistic situations perhaps boosted by one of the other factors. One of the best examples of the last — though with many of the earmarks of the other categories — is Digital Equipment Corp.

1967

Every individual income tax return is now going into a massive computer file. The only way a person can avoid paying income tax, the IRS asserts, is not to make any income.

July 31, 1968

Following two "catch-up" years of staggering growth, it looks as if the computer industry has settled down to its normal, long-range explosive growth rate of between 16% and 17%.

1969

The scope of IBM's unbundling was very broad indeed. The reduction in price, however, was very slight. Read IBM's announcement to mean a quite steep increase in users' data processing costs.

May 16, 1969

The following review of one of the earliest computer shows will resonate with anybody who has witnessed Comdex. To our 1969 editor: ditto, 25 years later:

It's very refreshing when newspapermen, who must cover a wide variety of subjects, capture the real essence of a story that more technically oriented journalists find a challenge to grasp. This was the case at Spring Joint, in Boston. We feel no reason to attempt a better description:

A 21st century carnival. A light show. Public relations run amok. A taste of the breakdown that may face an overpopulated world.

The Spring Joint Computer Conference in War Memorial Auditorium is all those things.

The Auditorium is a midway. The barkers are female, miniskirted, with cleavage. They schill for $100 million worth of the latest in computer and related equipment that cost its manufacturers hundreds of thousands of dollars to display.

There are colored lights, gas-filled balloons on strings, and buttons that declare their wearers to be "compatible" and more. There are hot dogs and hamburgers and a hospitality suite around every corner.

It is the show that brings out 5000 representatives of the industry and 15,000 "others" — buyers, scientists, engineers, radicals, students, rubbernecks. Often it seems as though everybody is a public relations representative . . .

Come up to breakfast, to brunch, to lunch, for cocktails, to dinner. Be our guest at Pops at the Playboy Club, come up to the room and have a belt and let's talk about our new analog to digital time-sharing compatible disk pack readout that is the fastest, biggest, cheapest, easiest to operate little 'ol' thing you ever saw.

Not a chair anywhere in the Auditorium where it is wall to wall people. Weary, glassy-eyed conferees roam the corridors of the Sheraton looking for an empty sofa. But they are all taken by slack-jawed sleepers who have had it.

Try for an elevator, and wait . . . wait . . . wait. Shout for a taxi, and shout in vain. Not a cab within four blocks of the Prudential Center and the traffic is congealed, anyway. Every restaurant from the waterfront to Framingham has hungry customers stacked up. Not a hotel room to be had for 55 miles.

— Donald White, *Boston Globe*

June 16, 1971

The computer industry being what it is, the calculation of negative growth rates is a seldom-used technique, and EDP/IR had to refer back to the textbooks while examining the custom software markets

Later in that same issue:

The trouble with "software" companies, however, is not always software sales. Most of them have diversified into higher-level consulting and research, or into computer-based services, and sometimes it is the diversification that backfires, with a bang.

December 31, 1973

How do you break IBM up without destroying the computer industry?

The easiest way to start a conversation with anyone who even thinks he knows something about computers or the computer industry is to ask THE QUESTION, posed above. EDP/IR doesn't know the answer . . . hasn't heard one that holds water.

. . .

Just as we think 1974 may be the year in which computer communications seem certain to see radical improvements and less regulatory intervention . . . we begin to wonder if it could also be the year in which — somehow — all the legal entanglement begins to disappear from the information processing industry. Maybe, somehow IBM could figure out a way to preserve justice, protect stockbrokers, prevent its "bank" from being siphoned away . . . and above all permit computer users — soon almost everyone — to take maximum advantage of what is without doubt one of mankind's most powerful inventions?

July 30, 1974

"The easy things in the computer field have been done. It is much simpler to develop computers than to apply them effectively" — William C. Norris, CEO of CDC

June 19, 1975

IDC estimates that at yearend 1974 there were 820,000 keyboards in use in the United States.

January 15, 1976

"What you really want to do in a new product," asserted a DEC speaker at the [DECsystem 2040 introduction] press conference, "is give them new hardware but old software. Tried and true stuff."

September 22, 1977

The information highway, 1977

The introduction of sub-$600 computer systems . . . has suddenly made personal computers attractive as a home utility and as a source of entertainment. This user segment has tremendous market potential if/when the devices can be used as interactive receiving sets . . . . Indeed, the brightest prospect for the home computer lies in its use as an information appliance (for online for access to outside resource material and databases), and because this utilization will require telephone link-ups, it is likely that AT&T will direct some attention to this market.

September 15, 1979

The first portable PC:

IBM introduces the first portable desktop (and take-home) computer, the IBM 5100 . . . weighing in at 50 lbs., carrying case available.

It's a humdinger. Though IBM is mass marketing the system to rope in first-time users, the system could easily carve some business out of the timesharing industry . . . while turning the market for large, programmable calculators into a whole new ball of wax.

March 12, 1979

It looks as if the new decade will bring with it a quantum leap in computing power — thanks both to feats of hardware technology and software efforts,

particularly in making computers easy to use. . . . "Far out" technologies are coming, according to their proponents. Josephson Junction will be in commercially available products in 1984 . . . . Ovonic memories, or those consisting of amorphous film, should find their way into optical computers as well as some current devices on the market.

August 14, 1984

Nineteen eighty-four may be remembered as the year the software business got nasty. Inflated vendor claims and heavy advertising have combined with layoffs — Visicorp, Micropro, Condor Computer, Software Arts, and Ask Micro — and falling earnings to shake both user and venture capital confidence. Additionally, the industry (other than Microsoft) has been largely unable to develop successful follow-on products.

Later in that same issue:

MICROSOFT TOPS $100 million mark. For its fiscal years ending June 30th 1984. No one customer accounts for more than 10% of sales.

August 31, 1984

Microsoft is steadily working toward compatibility between MS-DOS and Xenix . . . A stated future goal is binary compatibility . . .

October 25, 1984

What it all adds up to is simple. As far as traditional mainframe architectures go, the race for improved price/performance is quickly coming down to IBM vs. Japan (Fujitsu, Hitachi, and NEC).

About two years ago it was common industry wisdom that IBM and the other mainframe companies would out their emphasis on building fully compatible product families, offering large customers integrated and distributed solutions. The most common example of this was the expectation that IBM would act quickly to resolve the overlap between its S/38, 4300, S/36, 8100, and S/1 systems.

Suffice to say that this has not happened at all. Because of their desire to maintain profitable product lines and because of their need to get into new markets, the traditional mainframe companies are bringing in all sorts of new boxes without necessarily imposing stringent compatibility requirements.

April 23, 1985

Mark Twain once warned against assuming that trends could be extrapolated, indefinitely, without concern for context or common sense. The Mississippi, he noted, was 242 miles shorter than it had been 176 years earlier. At an average shrinkage rate of 1.3 miles/year, "any person can see that 742 years from now the Mississippi will be only a mile and three-quarters long, and Cairo and New Orleans will have joined their streets together, and be plodding comfortably along under a single mayor and mutual board of aldermen. There is something fascinating about science. One gets such whole sales returns of conjecture out of such a trifling investment in fact."

The computer revolution has been so sudden and mind boggling that industry watchers tend to become science fiction writers, often with good reason. But Mark Twain was right: we do need a reality principle in place before we simply extrapolate current trends and expect future growth rates to replicate or surpass today's frenetic pace. For example, utopians who thought that the information industry could avoid business cycles have recently been chastened. And there may be other barriers along the Silicon Marathon that might keep finishing times a little slower than many participants are now anticipating.

The problem is determining just what are the parameters of the MTE (Mark Twain Effect) in particular cases — that is, what are the barriers of context or common sense that can throw extrapolations seriously off target, like the fact that the Mississippi can't get shorter than the perpendicular distance to the mouth.

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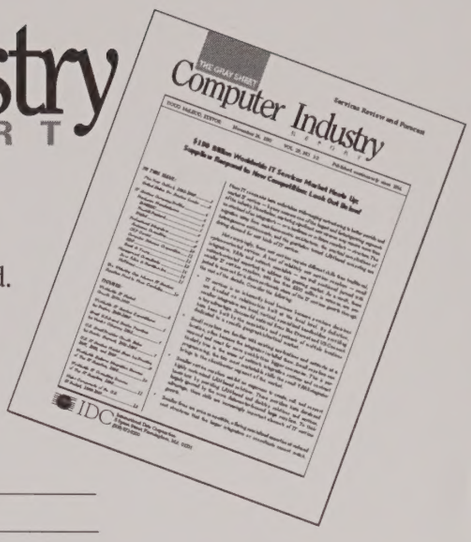

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Volume 29, Number 11

March 29, 1985

If the announcements on March 26 do not quiet all doubts, they do offer the first tangible evidence that AT&T can become a major force in office automation. Maybe not today, since the advertising line, "The Computer with the Future Built In," means that even AT&T admits the market is not there yet. But AT&T strategists believe it will be, and if their bet pays off, their new products demonstrate the technology to make it pay off big.

. . .

The 7300 Unix PC is a computer phone, telecomputer, voice-data system, or whatever, with hardware that allows simultaneous transmission of voice and data plus especially impressive phone management software that manages the two.

. . .

And it is Unix, of a sort — an enhanced System V . . . after all of the talk about standardizing Unix, AT&T has complicated the picture even more with a new variant. . . . Hence the would-be Unix unifier AT&T is advising VARs and software manufacturers to prepare two versions of every Unix PC program, windowed and windowless.

September 11, 1987

Life begins at 30, or so Digital has reasons to believe. But what happens then?

Thirty years ago, General Georges Doriot, the Harvard Business School guru who died on June 2, provided seed money from his American Research and Development Corp. (the first non-family-owned venture capital company in the U.S.) to enable a young researcher/entrepreneur named Ken Olsen to found a computer company. Digital's adolescence was marked by many highs and its share of lows, but today the company has come of age as the multiuser alternative to IBM.

February 19, 1988

IBM restructured because Armonk, after years of denial, finally realized that it has a real problem on its hands. Things aren't, nor are they soon going to get, significantly better.

April 15, 1994

The Next 30 Years

"We will not anticipate the past; so mind, young people — our retrospection will be all to the future"

— Richard Brinsley Sheridan, 1751–1816

The not-unpleasant distraction of reviewing 30 years of the information-technology industry is a good way of shedding light on the future. The next 30 years will be filled with a similar level of discontinuity and drama. Many questions and challenges from the past will be repeated. In addressing them every bit of historical perspective will help.

What are the technologies that will rock the industry during the next 30 years? Many of the most important (and certainly the fastest growing) will revolve around consumer computing or mass computing. The depersonalization of the PC and the growth of wireless information services are two examples.

Network intelligence will slowly chip away at PC users' attachment to their PCs. Instead, the value for PC users will lie in their data on the network. Local processing and storage will migrate to the network (where they're better handled anyway). The value of any individual computer (PC, minicomputer, super computer, or mainframe) will become a function of its network access.

PCs will become true commodity items — given away by information service suppliers. These units will become as disposable as pocket calculators (an evolution that took almost 50 years). Razor-thin hardware margin will stand in stark contrast to service- and transaction-providers' more lucrative commission structure. Tremendous market share and power will accrue to vendors who embrace this ubiquity of computing as a liberating concept, rather than propagate illiteracy (read also: inability to communicate) as a control mechanism.

In addition, the growth of information services will stretch the concept of applications and data. Data and applications will become indistinguishable from each other. Software without data will become obsolete. Likewise the corollary.

What does this mean for the industry? For one, a new class of services companies will rise and will serve a similar function to today's publishing companies. These former publishers will become the outermost end of the IT value chain. They will add value by customizing the network experience to individual tastes.

For another, companies will need to become even more adaptable. Over the next 30 years getting in and getting out of a platform or product will be critically important. Commitment to a specific ideology can quickly foster a stifling groupthink disorder.

One cycle is clear: prospering in successive technology waves is very difficult. It wasn't until the AS/400 that IBM got the minicomputer right. Digital has never been a leader in PCs.

It's the same with software, too. Consider Cullinet and Lotus. Microsoft is only now facing its most significant challenge. It is trying to replicate the success of DOS (Windows has really just been an extension). History has shown that the odds are stacked against Microsoft. It is a challenge that every other IT supplier will face sometime in the coming years.

IT suppliers will need to balance two often incongruous qualities for continued growth. An ability to impart a vision for how customers can protect their investments remains tantamount. Doing so without clinging to doomed models, architectures, or world views is the hard part. But there is really no other course for established or growing IT companies alike.

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Digital's Third Quarter Financials: A Red Spring Surprise

Digital's $183M loss was an ugly spring surprise and came on top of an equally bad previous quarter. It raises alarming questions about the company's ability to recover, and the steps it may take to do so.

Digital's inability to forecast its own results make predictions about its recovery difficult. However, a return to profitability in 4Q94, traditionally its strongest quarter, remains questionable. Moreover, the financial consequences of further restructuring are cause for concern. Digital's current reserves will handle the 4Q94 headcount reductions (7,000 people, mostly in Europe). Nevertheless, we expect a major restructuring with 10,000 to 20,000 layoffs worldwide during 1Q95 and 2Q95. The result could burden Digital with a crushing debt load.

Digital, however, has $1.2B in cash for restructuring. Despite all the negative news, we continue to believe that its fundamental strengths will enable it to survive and eventually revive. Besides, there were some bright spots in the 3Q94 financial results. Several areas exhibited strong growth (e.g., storage, PCs, and Alpha AXP products).

Coming on the heels of the 2Q94 loss of $72M, Digital's latest surprise means that income for the last nine months stands at a loss of $347M. This figure now exceeds the $344M lost during the same period in 1993. Year-over-year the losses were largely the same. Note these points from the quarterly results:

- **Loss** — For 3Q94, Digital lost $183M compared with a 3Q93 loss of $30M. Admitting surprise, Digital blamed it on an accelerated migration of sales towards lower-cost and less-profitable products, a shortage of workstations, eroding VAX sales, continued declines in margin-rich services, and a noncompetitive cost structure.
- **Revenue** — Compared to a year ago, overall revenue declined 6%, product sales dropped 1%, and services fell 11%. Total operating revenues fell to $3.3B from $3.4B. Product sales dropped to $1.7B from $1.8B and service revenues plummeted to $1.5B from $1.7B. On a positive note, Digital cited strong revenue growth for Alpha AXP (systems and workstations), PCs, and storage.

April 29, 1994 Vol. 29, No. 12

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- **Geographies** — U.S. revenues grew slightly. Asia/Pacific showed good growth, but Digital only derives approximately 10% of its sales from this area, so this contribution did not offset other geographical weaknesses. Compared with earlier quarters, European declines slowed. Foreign currency fluctuations were also a negative factor, but to a lesser degree than in past quarters.
- **Expenses** — Cost of Product Sales rose 15% because of increased unit volumes, advertising is in selling, general, and administrative (SG&A) and promotional expenditures. Research & Development spending fell 10%, and SG&A dropped 9%. The balance sheet remains strong (approximately $1.3B in cash), but long-term debt now stands at just over $1B. The company's stock is now trading under its book value ($33.73).
- **Alpha AXP sales** — Along with PCs and Storage, Alpha AXP products showed strong growth. Year-over-year, it more than doubled revenues to 15% ($262M) of product sales. From 2Q94 to 3Q94, revenues were up 66%. Alpha AXP is now 27% of system revenues. Without PCs, Alpha AXP accounts for roughly 50% of all system revenues and is approximately equal to VAX sales.

Alpha AXP Sales

With respect to VAX revenues, product sales are falling 5–10% per quarter. (VAX sales are falling at double-digit rates.) VAX declines are very nearly offset by revenue increases in other areas. This decrease is particularly acute in the medium-scale area (systems costing between $100K and $1M). It appears that DEC 7000 and 10000 AXP sales are growing, but the volumes are well below VAX 6000 during a comparable period in its product cycle. Moreover, the upgrade business appears to be rapidly shrinking as users concentrate on adding memory and replacing storage subsystems rather than CPUs.

Management

Digital's management remains uneven. As head of R&D, Bill Strecker executed magnificently on reducing expenditures while producing excellent products. Charley Christ (Storage Business Unit) and Enrico Paesetori (PC Business Unit, and now senior sales/marketing official) are clearly succeeding. Jesse Lipcon (OpenVMS Marketing) and Willy Shih (Unix and Windows NT), respectively, are aggressively driving full VMS support on Alpha and dramatically turning around DEC's Unix strategy.

Bob Palmer gets a mixed review. CEO Palmer is changing Digital's culture for the better, but failed to deliver on his commitments to maintain margins as product sales shifted to the low end. It seems unlikely, however, that Palmer's job is in trouble.

The departure of senior VP of Sales and Marketing Ed Lucente was a positive change. Lucente got good marks for reorganizing marketing and placing Lipcon and Shih in key positions, but he never delivered on two key objectives: revitalizing Digital's direct sales organization and rebuilding its indirect distribution channels.

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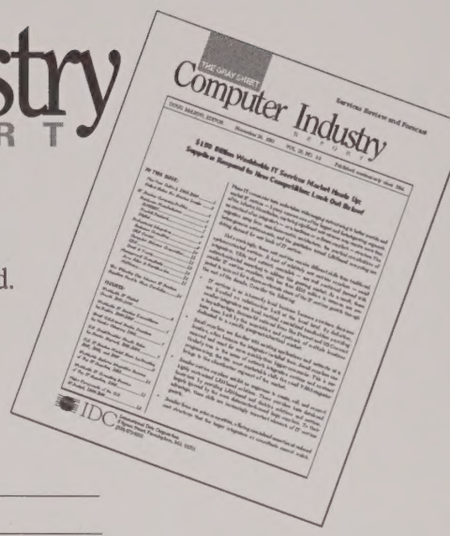

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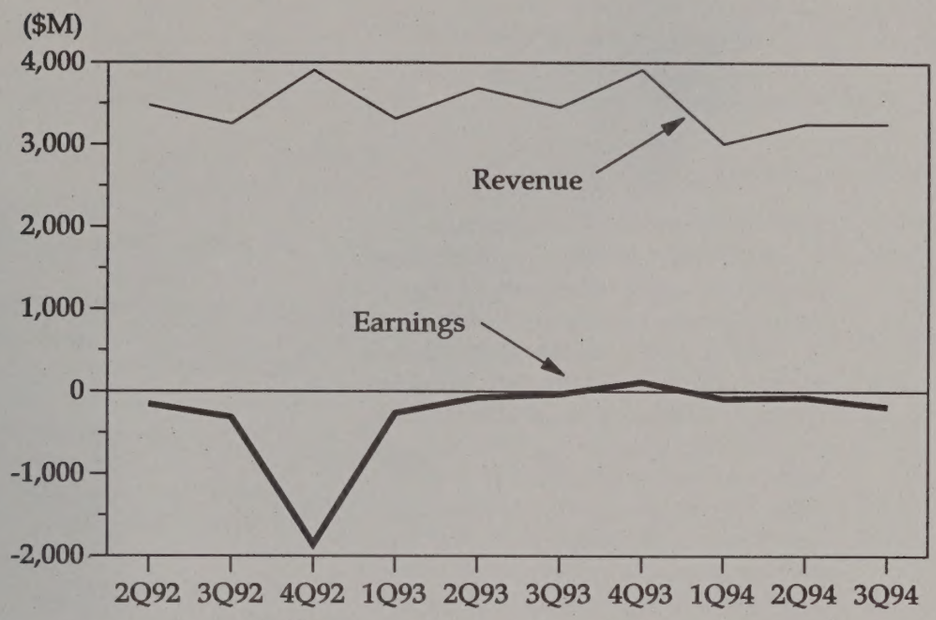
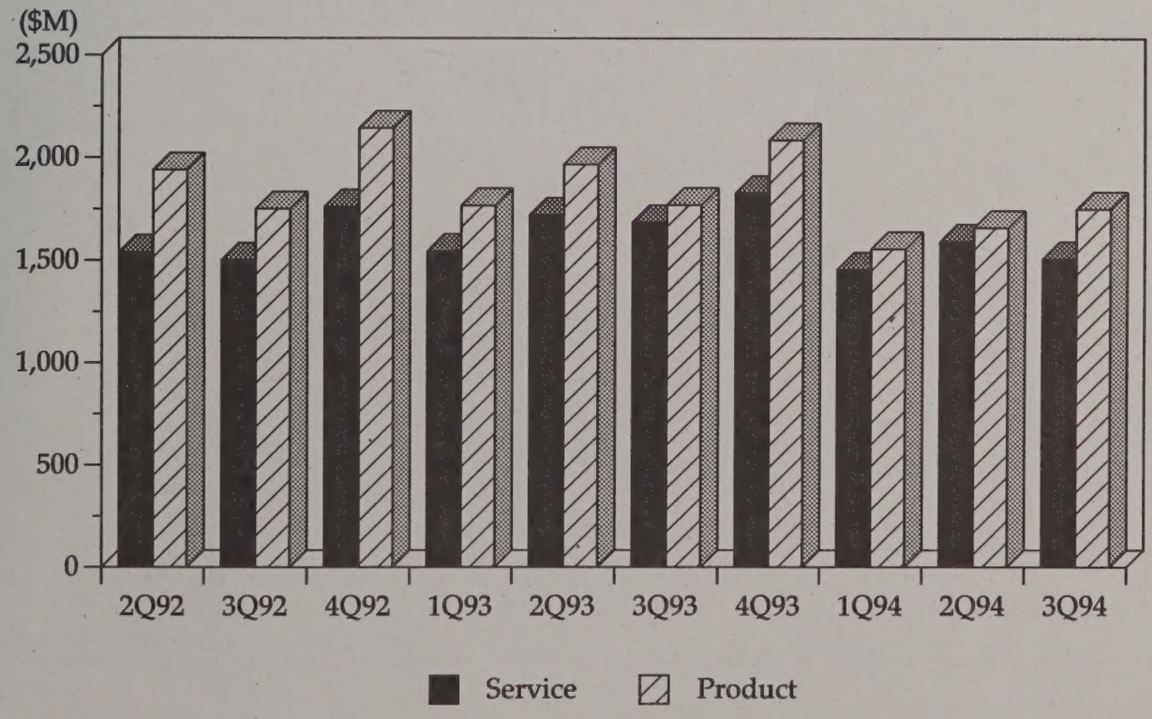
Digital Quarterly Revenue, Net Income ($M), 1992–1994



Source: International Data Corporation, 1994

Digital Quarterly Service and Product Revenue ($M), 1992–1994



Source: International Data Corporation, 1994

From a sales standpoint, Digital remains too dependent on its own installed base, reluctant to sell Unix, and in need of an infusion of enthusiasm. These are massive challenges considering the company's transition, but greater progress is required.

Conclusions

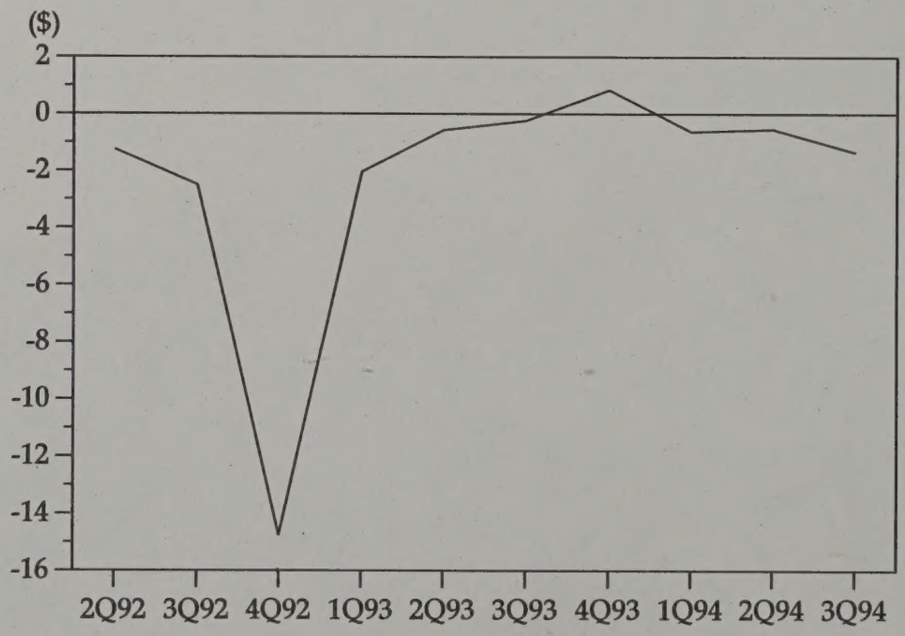
Several key areas will significantly impact Digital's fortunes — senior management changes, falling service revenues, European sales, and Unix's promise. Considering the massive losses to date, it seems unlikely that Digital will achieve profitability in fiscal 1994. Even just profitability in the fourth quarter is questionable. Looking forward toward 1995, the first two quarters also remain questionable. The remainder of the year will feature continued improvements in Alpha revenues, but medium-scale system sales will remain slow and write-offs for 10–20K layoffs will require large restructuring charges.

Continued management changes are likely. Over the next 9–12 months, Digital will refine its senior management team until a cohesive working unit is found. These changes will be driven by financial results, sales effectiveness, customer requirements, and employee morale.

Service revenues are a grave concern. Historically, this area's reliable revenue stream buffered weaknesses in other products. At roughly $4B a year, maintenance services are a big contributor, but their contribution is declining because many users are replacing costly older storage subsystems (40% of maintenance revenues), reducing maintenance expenditures on existing systems, and buying more reliable small systems. Professional Services (the other half of Services) at $3.5B is growing, but not fast enough to counterbalance maintenance declines. A positive shift will likely occur, but not until calendar 1995.

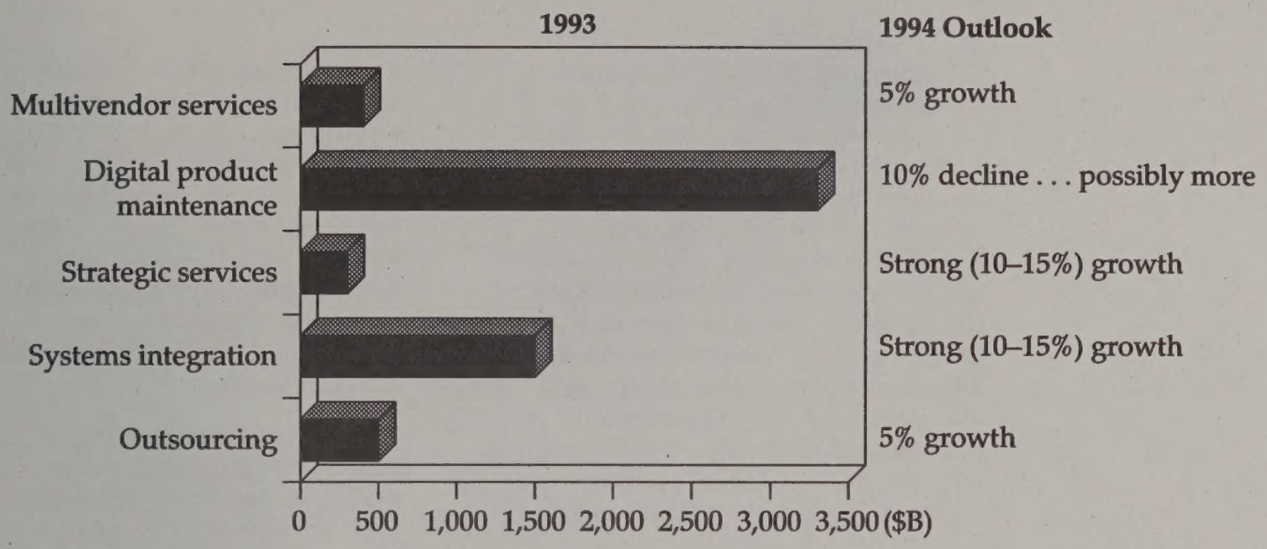
With roughly 50% of Digital's revenues coming from Europe, this geography

Digital Quarterly Earnings per Share, 1992–1994



Source: International Data Corporation, 1994

Digital 1993 Worldwide Services Revenue ($B)



Note: While Digital remains a very competent services supplier, it is being victimized by the success of newer, less expensive and more reliable systems. In order to show overall services growth, Digital's revenue from strategic services, systems integration, outsourcing, and multivendor services would need to grow by approximately two to three times current (and strong) rates.

Source: International Data Corporation, 1994

remains a critical problem. New management, large layoffs (6,000), a real Unix product line, and the utilization of captive distribution channels (e.g., Kienzle, Philips, and Olivetti) is cause for hope. However, economic conditions remain poor, HP is gaining ground, and the PC LAN market is just beginning to pose a competitive threat.

Despite all these weaknesses, Digital retains some fundamental strengths. It now offers some excellent Alpha AXP products. Applications are readily available. Functional differences between VAX and Alpha are largely gone. Digital is finally espousing a rational business strategy for its Unix, Windows NT, Alpha PC, and semiconductor businesses. Most important, the Digital installed base remains surprisingly loyal. We believe these positive elements will enable Digital to survive and gradually recover.

A Spring Tonic for Alpha AXP

Digital's recent (April 12) announcement contained several positive messages and a few negative ones. Alpha AXP and its three strategic operating systems are now extremely competitive platforms for commercial applications. Digital's PC-oriented development strategy enables its multiuser systems to reclaim price/performance leadership. This announcement eliminates the remaining differences between OpenVMS on VAX and Alpha AXP. OSF/1's new multiprocessor and clustering capabilities significantly improve Digital's trailing position in the commercial Unix market.

On the negative side, the $6,000–7,000 premium for OSF/1 and OpenVMS over Windows NTAS is difficult to justify despite the differences in bundled hardware and software. General availability for OSF/1's and Windows NTAS's multiprocessor capability is not until the fall.

Digital's product introductions included a low-end multiprocessor Alpha AXP system, operating system functionality, technical computing, and small-scale VAX systems:

- **DEC 2100 Model A500MP** — Scalable from 1–4 CPUs, this new PCI-based Alpha AXP line offers aggressive pricing and performance, and comes with a three-year, on-site warranty. Based on PCI and EISA buses, the 2100 uses 190MHz CPUs. Additional processors cost $6,000 (Windows NTAS) and $9,000 (OSF/1 and OpenVMS). In addition, Digital unveiled the DEC 2100 Model A600MP in a 19-inch rack-mount cabinet that can hold up three A500MPs in a prepackaged cluster. Digital also announced its intention to upgrade current DEC 7000 systems to the 2100 with a higher-speed bus supporting up to 12 CPUs.
- **Operating system enhancements** — OpenVMS V6.1 eliminates any differences between the VAX and Alpha AXP versions. Digital enhanced OpenMVS clustering with T3 connectivity. It also outlined future OpenVMS enhancements, such as a 64-bit file system that natively supports heterogeneous clients. OSF/1 V3.0 gets SMP (up to six-way), increased standards compliance, and new clustering capabilities. The beta release of Windows NT's "Daytona" uses fewer systems resources, runs existing Windows applications faster, supports NetWare clients, and offers 2100 SMP support.
- **Technical computing** — Digital announced the TechAdvantage toolkit (for developing parallelized applications for Digital and Cray systems) and packaged clusters.
- **VAX systems and price cuts** — Digital introduced the MicroVAX 3100 Model 95 and VAX 4000 Model 105A with 30% and 33% price/performance improvements, respectively, over Models 95 and 100. Digital cut MicroVAX 40 and 80 prices. It also dropped the DEC 4000 Model 700 from $62,000 to $43,000.

With the April 12 announcement, Digital's new hardware and system software capabilities will quash many objections to Alpha. The new DEC 2100 Alpha AXP system offers sharply lower SMP prices. Moreover, a new three-year warranty also reduces long-term ownership costs. Coupled with Alpha AXP's uniprocessor performance, this announcement enables Digital to reassert its price/performance leadership.

On the systems software side, the OpenVMS releases on VAX and Alpha AXP are fully equivalent and synchronized enabling users to begin shifting production applications onto Alpha systems. More important, the release of OSF/1's SMP capabilities and the forthcoming release of more advanced clustering capabilities significantly strengthen Digital's Unix strategy. As for NT, Version 3.5 improves performance, eliminates NetWare coexistence problems, and provides additional support for its emerging role as a PC LAN server for production applications.

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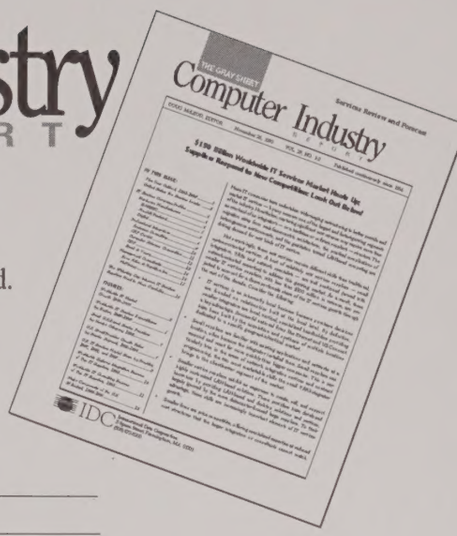

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DEC 2100 Model 500MP Server Configurations

	Windows NTAS	DEC OSF/1	OpenVMS
Number of CPUs	1	1	1
Memory	64MB	64MB	64MB
Storage	1GB disk, CD-ROM, floppy	2GB disk, CD-ROM, floppy	2GB disk, CD-ROM, floppy
Installed software	Windows NTAS (Advanced Server)	DEC OSF/1 NAS200+	OpenVMS NAS200+
Availability	June	April	May
Entry price (U.S.)	$18,900	$26,900	$26,900
ADVANTAGE-SERVER+	$22,000 with EISA/RAID)	$33,600 (with 128MB memory and EISA/RAID)	$33,600 (with 128MB memory and EISA/RAID)

Notes: NAS 200+ for OpenVMS includes: DECWindows Motif, ObjectBroker, DECmessageQ, DECprint Supervisor, DECnet, PATHWORKS, TCP/IP, and S/W Distribution Client.
NAS 200+ for OSF/1 includes: ObjectBroker, DECmessageQ, DEC RT, and S/OSF server extensions.

Source: Digital Equipment Corporation

Some rough spots slightly dim these positive attributes. For example, Digital is offering a confusing upgrade strategy for the small number of existing DEC 4000 and 7000 models. The abandonment of "strategic" bus architectures (e.g., Turbochannel and FutureBus) belies Digital's newfound commitment to Intel's PCI bus implementation. The ability of Digital's distribution channels to handle DEC 2100 systems remains questionable. Considering the price points, Digital must move these systems primarily through its indirect sales channels — currently weak, especially in the PC LAN and Unix areas.

Despite these negative thoughts, this announcement removes most of the functional impediments that prevented Digital's installed base from migrating to Alpha. For non-Digital customers, the low cost of the 2100 SMP-capable systems provide considerable "headroom" for expansion without imposing the traditional premium associated with this functionality. This is a strategic advantage over Digital's Unix competition (HP, IBM, Sun, and NCR).

Getting Good Weight: Digital's Fab 6 Dilemma

After 18 months of reorganization Digital is still having a devil of a time turning a profit. Sales are mired around the $12–14B range. Costs have been cut, but profits are still out of reach. The poor sales figures raise several issues, including product questions (are they any good?), organization questions (are we making it easy for customers to buy our products?), and people questions (do we have the right people selling them?).

Digital jumped right to the third question by replacing Edward Lucente at the top sales position last month. For good reason. Products are no longer Digital's largest problem. The Alpha-charged AXP line equals or surpasses competitive products. It has a credible Unix offering for the first time ever.

Likewise, Lucente got good marks for reorganizing marketing and placing Lipcon and Shih in key positions. But he never delivered on two key objectives: revitalizing Digital's direct sales organization and rebuilding its indirect distribution channels. Digital's sales force remains too dependent on its own installed base, reluctant to sell Unix (in fact many former Unix advocates have left), and in need of an infusion of enthusiasm.

So the sales job falls to Enrico Paesetori, who has built a strong track record within Digital's PC group. However, it is not unreasonable to expect that it will take a quarter or two for sales momentum to gather, at least.

In the meantime, Digital will reduce headcount during the next two years. It could be looking at an additional 20,000 or more layoffs. Taking this painful and necessary step will further drain resources. Digital's cash position remains strong ($1.2B in the bank and a debt/capital ration below 20%), but a prolonged retrenchment would erode that stability.

Additionally, Digital is seriously considering selling one or more business units, divisions, or assets. Apart from religious and sentimental issues, this option poses significant problems of its own. Taken individually, Digital's assets are not particularly attractive:

- The company's most visible asset, the Systems business unit (BU), will likely have FY94 revenue totaling $3.5B; it will lose approximately $600-900M. To make matters worse, VAX sales are dropping by 30–40%. The unit has little value to anyone other than Digital.
- The PC BU will see $1B in revenue with tiny, if any, profits. Its assets are primarily tied to Far Eastern manufacturing facilities, sales channels (telemarketing and direct), and the Digital name. All these elements have a relatively small enduring or inherent value.
- The Storage BU is throwing off $200–300M in profits on FY94 revenue of approximately $1.5B, but the entire industry has excess capacity. In the past, Digital has received offers for this business in the $250–500M range.
- The Multivendor Services represents the largest BU with $4B in revenue and $1B in profit, but its appeal is diminished somewhat by ties to declining VAX maintenance revenue.
- The Professional Services BU (about $2.5B and profitable in FY94) may be attractive to other vendors.
- The Components/Peripherals BU, with $500M in revenue ($1B if sales with systems are counted) and approximately $25M in profit, is marginally attractive.

Getting a good price for any of these assets will be difficult. As a result, Digital's new Fab 6 plant (a state-of-the-art semiconductor foundry) may be the company's biggest asset. Its sub 0.5 micron manufacturing capacity will be in strict undersupply for at least 12–18 months. Digital could likely find several interested buyers, and could probably command a pretty penny for it. As evidenced by Digital's deal with AMD to produce 486 processors, the Scotland fab also carries some value because it is capable of producing sub 0.68 micron parts as well.

However, selling off some or all of Digital's semiconductor operation raises several interesting questions: How can the company deal with the potential blow? Is cash alone enough to promise a long-term turnaround? Of perhaps even greater interest, can CEO Robert Palmer part with his most visible success story?

THE GRAY SHEET
Computer Industry REPORT

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IBM Is Hot: Like a Phoenix or a Flash in the Pan?

In the year since Louis V. Gerstner was appointed chairman of IBM the company has made several significant steps toward a return to long-term profitability. Among the most visible of the moves were last week's radical reshuffling of the worldwide sales force organization along industry lines, as well as the paring of over $3 billion in expenses. The most surprising was the departure of the head of the IBM PC Company — a group that had been until recently outperforming the entire PC industry and the rest of IBM.

IBM's chairman is the first to state that his job has only begun despite the scope of the changes he has already made. He and his CFO see another $3 billion in costs that have to go in 1994. Even more in 1995. IBM's top human resources manager recently left the company amid rumors he wasn't downsizing IBM's payroll quickly enough. According to Gerstner IBM needs to continue expanding its client/server market share, increase its focus on fast-growing developing markets outside the United States, and continue to modernize the IBM culture that evolved over 50 years of unparalleled financial success. In this issue of *The Gray Sheet* we present and review Gerstner's plan for reengineering IBM and examine three important areas for IBM's recovery: software, services, and communication.

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The Gerstner Plan

IBM's chairman's plan for rebuilding IBM is the result of his review of customer needs, an analysis of where the IT industry is heading, and an analysis of IBM's unique strengths. It is based on three types of actions: improve performance on key strategic executions, fundamentally alter IBM's cost structure, and change the IBM culture.

Gerstner feels that the next phase of the IT industry will be dominated by four new customer requirements. Customers will demand slower replacement cycles and a greater emphasis on upgrades and investment protection. They will seek to implement solutions that take a more balanced view between centralization and decentralization. They will have a "maniacal focus on value." And, they will place

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a "very, very significant premium on systems management, ease of use, true interoperability and openness."

Gerstner notes that many (if not all) of IBM's largest customers are talking about massive business process reengineering projects. These organizations want to know how IT can help them. They seek to completely rebuild their businesses so that "when the system is down there is no business."

IBM, Gerstner feels, has several distinctive advantages to succeed in providing this kind of solution. He believes that IBM has "extraordinary technology in our labs . . . we create a great deal of what happens in the industry." IBM has a strong customer base, and very smart people. Gerstner also feels that IBM is the preferred total-solution company, at least to bid. And, "despite the fact that the press can't get it right," IBM is the world's largest software, computer, and services company.

Gerstner summarizes IBM's challenges with three imperatives. IBM must fundamentally alter its cost structure. It must substantially improve strategic executions. And it must move to change its no longer appropriate culture. Specifically, Gerstner identifies six strategic points for reengineering IBM.

1. **Focus on profits:** IBM sells $60 billion worth of "stuff" every year, but it doesn't make any money. The company's profit margin dropped from 55% to 38% in 30 months. Gerstner indicates that IBM must rightsize by paying down debt and writing off old assets and the cost of employment reductions. The net result: IBM has stopped hemorrhaging; margins have stabilized. It made a small profit and experienced a positive cash flow in Q4 1993; Q1 1994 profit totaled over $300 million. IBM removed $3 billion in cost out last year. It will remove another $3 billion in 1994 and the remainder of its target in 1995.

2. **Position product line for growth:** IBM is in the process of realigning itself for growth. It is shifting as much as possible in new areas, and it is learning to execute better in opportunity areas that are staring us right in the face." Gerstner indicates that he has identified 15–20 projects in six strategic imperatives.

An example is a renewed focus on leveraging technology (within IBM's product lines and externally). IBM's recent announcement that future Hitachi systems will be based around the Power architecture (one example of this kind of leveraging is further examined on page 5).

IBM is committed to leadership in object technologies. The company will be much more aggressive in taking technology to the bottom line by making it available to others in the industry. IBM's recent deal with Cyrix reflects world-class process and manufacturing technologies, just another area that can be exploited outside the traditional IBM confines.

Another area of focus according to the chairman is the client/server market. Gerstner notes that missing the client/server opportunity was "probably IBM's biggest mistake, and we're late, but not too late." He feels that customers are looking for C/S integration services, security, control, and solutions. A key component of this strategy is the 40 open-system centers.

IBM will be increasing its development and sales efforts to promote network-centric computing. Gerstner feels that the overhyped information highway will take shape in corporate America far more quickly than in consumer markets. His aim is to take advantage of IBM's existing network infrastructure, Advantis.

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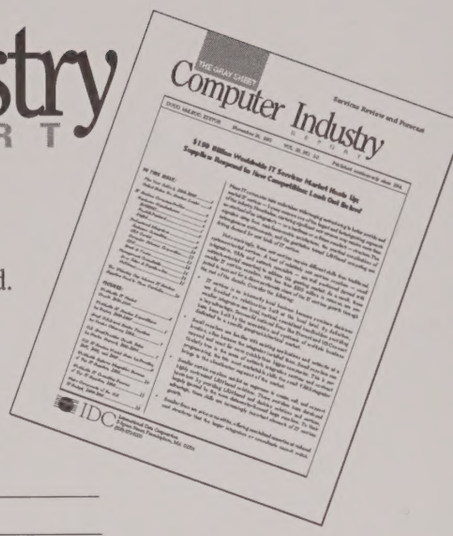

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Gerstner feels IBM's role in the information highway will be twofold. First, it will be actively involved building infrastructure components: ATM, PowerPC set-top boxes, and more. These will be sold to cable companies and telephone network operators. Second, IBM will play a role as a major systems integrator selling complete solutions to customers. In this capacity the company will simply leverage its significant experience building and managing broadband networks to assist customers.

3. **Improve distribution efficiencies:** Gerstner has made a strong commitment to "reengineer the way IBM goes to market." He feels that this initiative will result in several new methods of distribution and will lower distribution costs. It will also result in a much more specialized sales force with vertical focus and "much less" geographic focus. The recently announced reorganization of the sales force in the United States along vertical lines is the most visible sign of this focus.

4. **Open global opportunities:** Under its new chairman IBM is also stepping up its efforts to exploit opportunities in developing regions of the worldwide IT market, primarily Asia, Latin America, and Central Europe. Gerstner cited several significant recent wins, including a $250 million contract to integrate a bank in Argentina, an agreement to establish a PC assembly plant in Russia, the sale of 40 ES/9000s, 100 AS/400s, 2,000 PS/2s to one of China's four largest banks, and a joint application-development agreement with the Central Bank of China. Of perhaps even greater significance is the recent announcement of collaboration with the Chinese government on the construction of several different portions of the "Golden Project," a major information highway effort (see page 12).

5. **Leverage size:** Finally, Gerstner is determined to improve the way IBM leverages its size and scale to reduce the cost of manufacturing and distribution. This is a more fundamental coordination and leveraging of organizational resources than simple cost cuts or sales force reorganizations. Gerstner feels it is tantamount to transforming IBM's culture. He feels that the company remains rooted in the past, and that it has been built on assumptions that worked pretty well, resulting in a cultural icon dominated by formalized, rigid decision making.

6. **Target specific industries:** IBM's public announcement that it will reorganize its sales force by industry instead of geography represents a significant, if not historic, change. In the future, the focus will be on selling integrated solutions to specific industries, not simply products. Solution selling makes sense. It acknowledges the heterogeneous complexity of IT and leverages the breadth of IBM's product line. The very technologies Gerstner intends to stress, client/server and networked systems, are inherently integrated technologies. The change is not unexpected.

   IBM's sales organization has been evolving in recent years. Layers of management have been thinned as have the ranks of the sales force. Compensation is more closely tied to profitability and customer satisfaction. ISSC already markets through industry groups. In Gerstner's first year, IBM began moving in that direction as well. An industry-based sales structure is already in place in metropolitan Chicago and New York. Mr. Gerstner has now simply stepped up the process of change.

   The new direction will surely meet with resistance. Marketing personnel, accustomed to selling products, must now become industry experts and consultants. Geographic managers, who have long held sway over industry specialists, will lose clout. Undoubtedly the transformation will take months if not years and may ultimately include permanent exceptions. For now, islands of autonomy will remain, such as the RS/6000 group. But IBM is changing the way it does business. In the past, the company's marketing organiza-

tion has dictated that direction to a great degree. It must also change.

Gerstner notes that with product cycle times under a year, with profit margins that do not allow the company to do what it has done in the past, IBM must adapt. Gerstner indicates that "the marketplace is telling us 'we want things to work together.'" Gerstner's opinion is that in a networked world autonomous units within IBM would be a mistake. The vision of managing a "centralized IBM working together more effectively" is a strategic decision he has made.

But What About . . .?

By several measures IBM is a changed company from one year ago. It now has a lower cost profile; it has modernized its archaic sales bureaucracy; it has more client/server solutions; it has a commitment to industry-leading architecture; it has a strong international focus. Clearly, the company is taking many of the appropriate actions to achieve long-term success.

However, if good intentions alone were enough, IBM would be trading near $130, back where it was before prior management fell asleep at the wheel. Instead, it's riding along at about $60. IBM still has fundamental weaknesses. The stock jumped last month after news of the good quarter, but its long-term challenges remain. These are the issues that the chairman hopes last week's reorganization of the sales force will address. In addition, the stock's lackluster performance may be due to the following factors:

- **The Federal Systems Division is gone.** It was profitable, it was autonomous, and it was doing more to build and develop downsizing expertise than almost any other group at IBM. Why sell a profitable, complementary, strategic asset just because you can get a good price?
- **IBM's old guard is still in power.** Gerstner's top technical strategist is James Cannavino, his top U.S. marketer Robert Labant. Both rose through the old IBM ranks. Both have built decades-old relationships and friendships with some of the very "feudal lords" (Gerstner's words) who must go. Their ability to lead a punishing reformation has to be questionable. Not impossible, just difficult.
- **The PC Company has lost momentum.** With so many good products coming from a half-dozen worldwide brand-name suppliers, customer loyalty is at an all-time low. One or two good products will carry a PC company for only a few quarters. Long-term success depends on regularly pumping out competitive products; there are no laurels left to rest on.

In addition, several issues beyond Gerstner's control still plague the company:

- **Hotshots have left.** A layer of younger management has steadily departed from IBM over the past two years. These were many of the young hotshots that might have accelerated IBM's push into open systems and client server. The company desperately needs forward-looking salespeople to help IBM customers subdue the intimidating open-system world of the future.
- **Mainframes still rule.** It's not Gerstner's fault that IBM's mainframes still rule the company's bottom line. But it is his problem. Customers know that IBM cannot offer the price/performance levels of industry-standard, commodity microprocessor-based systems just by calling a mainframe a "legacy server."

Don't be fooled by the recent rise in IBM's stock price. Reorganization of the sales force is one of the first really big, tough decisions Gerstner has to make. Though the ship is slowly turning around, do not doubt that it will take a long time.

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IBM and Hitachi, Ltd., Sign Large-System Technology Agreement

Under the far-reaching technology partnership negotiated between IBM and Hitachi, Ltd., IBM will sell S/390 microprocessor parts and OEM SP2 systems to Hitachi. The S/390 CMOS microprocessors (μCPUs) will be modified to support Hitachi's VOS mainframe operating system. Hitachi will get engineering samples in late 1995. To increase manufacturing economies, IBM will use the same modified S/390 μCPUs in its own systems as it sells to Hitachi.

Hitachi can remarket IBM's SP2 machine through any of Hitachi's existing channels. There are no branding restrictions on these systems. Hitachi has also licensed AIX/6000; however, it can only remarket AIX/6000 under the Hitachi or Hitachi Data Systems brands. In 1998, Hitachi will have the option to remarket specified Power technologies, enabling it to design and build its own Power-based systems. IBM is not OEMing Parallel Sysplex machines to Hitachi, only S/390 microprocessors. Hitachi will have to build its own compatible parallel sysplex systems. This effort should be simplified by the fact that IBM is going to publish specifications for the coupling facility as part of its agreement with the European Community.

The agreement runs through 1999. Hitachi is paying IBM approximately $100 million to cover any required modification costs and for access to proprietary IBM technology. The agreement will generate significant revenues for IBM across the large-system value chain, leading to increases in mainframe market share for the company. The accord enables IBM to reestablish its position as the driver of large-system architecture in the industry.

Impact on IBM

IBM is impacted by this announcement in at least five ways:

1. S/390 can more easily follow industry price/performance trends. Microprocessor costs are very sensitive to volumes. While IBM is using identical process technologies across its microprocessor lines, any S/390 parts built for Hitachi will increase the efficiencies of any given S/390 mask setup and run. This is a key reason why IBM will likely use the same modified chips developed and built for Hitachi.

2. IBM will realize revenues for sales of S/390 parts and SP2 OEM machines. These revenues will be modest at first, but there can be no doubt that over time IBM's share of the large-system revenue pie will increase. This announcement could result in a 5–7 point gain in market share for IBM by 1997.

3. IBM's development focus will be improved. Having a customer with as much design and manufacturing experience as Hitachi can provide IBM with key feedback about its S/390 and Power parallel road map.

4. IBM's large-system design, development, and manufacturing capacity may become more flexible and easier to manage. This OEM agreement could tie significant portions of IBM's S/390 development capacity to revenue, making it easier to track returns on development investment.

5. Higher likelihood exists that IBM will continue to drive large-system standards for compatibility. Thanks to this agreement, Hitachi faces much less uncertainty about its ability to maintain compatibility. The combined strengths of the two companies on a worldwide basis effectively guarantees that IBM will remain in position to drive large-system standards — either S/390 or Power/AIX/6000.

This agreement does not help IBM reestablish the benefits of large systems to customers in general. The company still faces that challenge. Nor does it remove all the risk from its microprocessor-based parallel sysplex strategy. A tremendous amount of function must be

delivered and proven during a relatively short amount of time. Finally, it does not provide IBM with an excuse for not delivering pricing information on its S/390 systems. IBM is still competing with an expanding variety of technology substitutes characterized by explicit hardware prices.

Nonetheless, this appears to be a very positive agreement for IBM — one that should help it establish the credibility of its parallel sysplex strategy.

Impact on Hitachi, Ltd.

Hitachi has been gaining share in the worldwide multiuser systems market over the past few years, in part due to its mainframe systems and DASD product successes. This agreement strengthens Hitachi's market position by:

- Defending Hitachi's decentralized mainframe channels from encroachments from IBM.
- Reducing market uncertainty about Hitachi's ability to maintain compatibility for its channel partner's products.
- Improving its ECL-based uniprocessor directions by providing a much clearer market position for the product — namely, an increasingly small subset of applications needing leading-edge uniprocessor speed — within an expanded Hitachi product line.

However, there are also negatives in this agreement for Hitachi. Given that the company had already made a commitment to Hewlett-Packard's PA-RISC technology, Hitachi now must explain a newly complex RISC product strategy.

Moreover, there are likely to be repercussions within Hitachi, Ltd., as it comes to grips with the fact that it essentially is relying on U.S.-based companies for almost all of its computer products. Although Hitachi has always been on better terms with IBM than Fujitsu, it is a mistake to say that IBM and Hitachi have been best friends. This agreement will require that Hitachi, Ltd., make important adjustments to its self-image if it is going to succeed.

Additionally, this agreement allows Hitachi, Ltd., to sell the SP2 technologies through existing channels. Hitachi's flexibility to adjust its channels, either by adding new partners or facilitating future combinations of channel partners, might be impacted.

Finally, the agreement does not guarantee S/390 compatibility. Hitachi still will have to invest significant resources to develop parallel sysplex technologies such as the coupling facility, EMIF, and others.

Impact on HDS

This agreement means that HDS now has the second-best product line in the high end of the market. Its large-system DASD products continue to sell well, as do its S/390-compatible ECL products. The addition of the SP2 and, in time, μCPU-based S/390 products ensures that HDS has a steady stream of sellable products in both Europe and the United States. Moreover, the company can appropriately target its increasingly powerful ECL-based systems to those customers that require 100+ MIPS uniprocessor performance in the future.

The only down side of this agreement for HDS is that it must prepare to deal with the same product transition issues currently facing IBM. Furthermore, whereas IBM is in direct position to influence its transition, HDS is twice removed: it must rely on Hitachi that to a degree must rely on IBM. HDS's equipment prices may come under pressure as its customers attempt to make sense of any upcoming transition.

The first fruits of this agreement will arrive early next year, when HDS begins remarketing an SP2-clone. Sometime during 1996, HDS will probably begin delivery of 9221-compatible (nonparallel sysplex) systems capable of generating hundreds of MIPS. Speculation on HDS's S/390 μCPU parallel product schedule will require additional information on HDS's parallel sysplex delivery schedule.

Impact on Amdahl

If there is a silver lining in this announcement for Amdahl, it is that it is likely to accelerate the rate at which the company's sales force adopts and begins to aggres-

sively market products stemming from the Amdahl partnerships with Sun and Oracle/nCube. However, that is the only silver lining in this agreement for Amdahl — unless the agreement blows up, which probably will not happen. In the light of the IBM/Hitachi agreement, Amdahl's recent successes, including separate announcements of partnerships with Sun and Oracle, suddenly seem less focused. This announcement puts even greater pressure on Amdahl to rapidly articulate an S/390 compatibility strategy and schedule. Additionally, it is likely Amdahl will have to respond to questions about how it will drive its multiple large-system Unix offerings into the higher-end Unix market that quickly may become dominated by Powerparallel technologies. Claiming Unix portability may not be enough for mainframe-class customers.

Impact on HP

This agreement will have minimal near-term impact on HP. Hitachi, Ltd., will continue to OEM HP's workstation and midrange machines (which contributed about $100 million to HP's revenues in 1993). Moreover, Hitachi, Ltd.'s semiconductor organization continues to sell PA-RISC-based microcontrollers. However, the fact that Hitachi, Ltd., may have the option to enter the PowerPC component business in 1998 will lead to questions about Hitachi's intentions. Hitachi's RISC strategies will be put under a microscope. It will be easy for the market to misinterpret Hitachi's positive moves with IBM's RISC CPU as a negative for HP's RISC CPU.

Conclusions

IBM's and Hitachi's technology agreement has far-reaching implications for large systems in particular and multiuser systems in general. The agreement is very positive for IBM, as it strives to establish the credibility of its parallel S/390 μCPU strategy. The agreement also enhances the market position of Hitachi, Ltd., and its leading large-system channel partner, HDS. While some challenges in the details are clear, both IBM and Hitachi, Ltd., will likely embrace changes necessary to make the relationship work. Near term, the company most negatively impacted is Amdahl. It will have to prove to customers that it has not been caught out of position. Longer term, Hitachi's behavior with its two RISC products will have significant consequences for both IBM and Hewlett-Packard.

AS/400 Advanced Series: An Attractive Combination of Old and New from IBM

On May 3, IBM announced the new AS/400 Advanced System Series and laid the foundation upon which it will build the AS/400's future in a RISC-based environment. The new AS/400s have sharpened their image with a sleek-looking black cabinet that houses the system unit and related I/O and will house future Power-based RISC processors. IBM has reduced the AS/400 family from three platforms or families (9402, 9404, and 9406) to two platforms (9402 and 9406). Although their appearance may be dramatically different, the processors, are still the CMOS and BiCMOS technology of the earlier AS/400 models. General availability of the new models shipping with an early release of Version 3 (V3 0.5) begins June 3, 1994.

Among the announcement's highlights:

- Fourteen new AS/400 models packaged in one of two new AS/400 footprints, a 9402 tower and a 9406 pedestal, replace the previous line-up of eighteen systems and three footprints, a 9402 tower, 9404 pedestal, and 9406 rack. Performance of the new systems ranges from the current second-smallest AS/400 machine, to the current high end of the AS/400 line. Base system prices range from $9,000 to $673,500 without OS/400.

- OS/400 Version 3.1 dramatically improves the AS/400's compatibility with industry database, networking, and application program interface (API) standards. IBM is renaming the integrated database manager of OS/400 DB2/400 Version 3.1, reflecting its enhanced support of DB2 SQL standards.

IBM also enhanced its client server products that were announced on September 7, 1993, with the announcement of the 9402-20S and 9406-30S. General availability begins on June 3. However, upgrades (same process as the traditional models) will not commence until September. Performance remains maximized for the client/server environment, and twinax attachments for an interactive environment remain limited to seven.

- New program products include Client Access/400, a much improved replacement for PC Support/400.
- User-based pricing for most software can simplify software configuration.
- The new systems will be "RISC-ready"; next year, it will be possible to plug Power RISC microprocessors directly into these packages without dramatically disrupting system behavior.

Smoothing the Upgrade Path

IBM has begun the process of incrementally stepping AS/400 customers to new RISC-based technologies. As DEC did with its "Alpha-ready" program as it moved its product line from VAX to Alpha technologies, these new AS/400 machines can be upgraded to future PowerPC RISC microprocessors with a simple field upgrade. However, unlike the AS/400's competitors, the machines' layered architecture should allow customers to move to new technologies without incurring significant migration expense.

Three broad features of these new systems will compel many customers to invest now rather than wait:

- **Price/performance improvements are significant.** Price/performance improvements range from 25% to 50%. Although competitors will be able to respond, IBM's actions with this announcement will erase much of any price/performance differential that exists between the AS/400 and other leading midrange platforms until PowerPC systems are introduced a year from now.
- **Software enhancements intensify the AS/400's client/server capability.** Performance and standards-compatibility improvements to OS/400 in the areas of networking, database, systems management, and Unix programming interfaces will attract new customers, especially large ones distributing replicated systems. IBM's intention from a Unix perspective is to attract the top applications in the market and make sure they will run on an AS/400. This approach could assuage prospects who might have considered an AS/400 in the past, but chose a different platform because it ran the required application. Over time, Unix developers might find the AS/400 an attractive alternative in their effort to expand business.
- **Straightforward road map to new technologies.** These new systems fit in cabinets that IBM will be using to house RISC processors that are expected to be announced during the first half of 1995. As such, existing customers who purchase an upgrade to the new AS/400 advanced series can get over the major hurdle of swapping their existing system and then replace the existing processor with a RISC-based processor in 1995. This feature should also be a comfort factor for prospects who are concerned with migration paths because they are getting in on the ground floor. Many of the new features on the AS/400 today will be migrated to the next generation.

Any migration can generate customer uncertainty, prolong sales cycles, and cut into revenues. IBM will have to execute its marketing strategy flawlessly to maintain revenues and market share for the year — especially in the face of aggressive price/performance improvements. However, it appears that IBM's first

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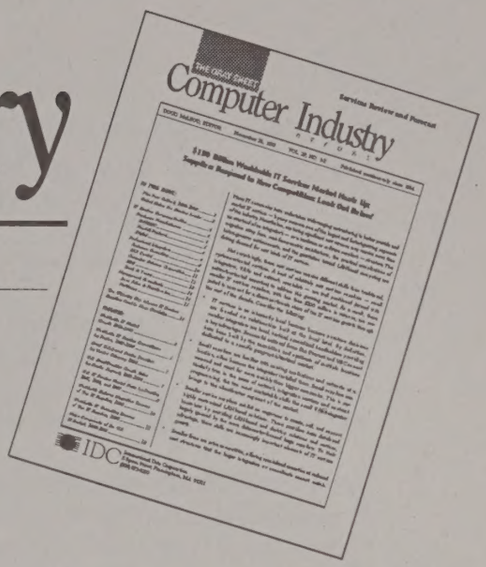

DOUG McLEOD, EDITOR APRIL 1994

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quarter AS/400 results were good, a very positive sign that the company's marketing plan is on track.

Model Upgrades to New AS/400s

The logical migration route for existing 9402 users who want the new AS/400 advanced systems is to the new 9402 platform. It is important for any existing AS/400 customer looking to upgrade to the new AS/400 to determine the expected number of users on the new model since going to Version 3 is user-based pricing (see page 10). The options for 9404 users are much more extensive because they can now choose to downsize to the 9402 platform or upgrade to the 9406 arena depending on growth requirements. The upgrade path for existing 9406 users to the new systems is more clear cut than for the 9404 users. The 9406 models 35 and 45 users could possibly migrate to the 9406-3x0 products (the true 9404 replacement) instead of the 9406-310 route. The upgrade path the low-end 9406 user eventually takes will depend much upon the future growth rate.

OS/400 Version 3 Release 1

The new version of OS/400 sports a broad array of new capabilities, including:

- Dramatically improved integrated database manager, renamed DB2/400.
- Enhanced integrated communications facilities, from the standpoints of architecture, features, and performance.
- Improved support for key industry standards, including much of the SPEC 1170, X/OPEN CAE, and Posix sets of standards.
- Generalized support for user-based pricing.

OS/400 3.1 will be available September 9, 1994. Until then, IBM will ship systems with OS/400 3.05. IBM still needs to move its complete family of Integrated Language Environment (ILE) compilers to OS/400 3.1. Although user-based pricing for OS/400 is included as part of V3R.05, general user-based pricing will not be available until V3R1. The company claims that customers will experience no disruption in support for existing applications.

DB2/400

IBM has renamed the integrated relational database manager of the AS/400, bringing it under the moniker umbrella of DB2. The new DB2/400, Version 3 Release 1 (DB2/400 V3R1), features the following:

- **No charge.** It remains an integrated feature of OS/400. Moreover, IBM has done away with the separately orderable SQL/400 feature, choosing instead to incorporate SQL support directly into the data manager. IDC's Cost-to-Use research shows that one of the AS/400's primary sources of cost-to-use advantage derives from the fact that customers do not have to purchase a database manager from a third party.
- **Standards support.** The AS/400's database has always been criticized for its uniqueness. DB2/400 V3R1 makes such criticism obsolete by introducing support for ANSI/ISO SQL2, greater compliance with IBM's own Distributed Relational Data Access (DRDA) specification, and Microsoft's ODBC Level 2 function.
- **New function for distributed client/server modes of operation.** As the database community wrestles with the challenges of distributing database processing and client/server data management, three technologies are emerging that provide approximate solutions: triggers, stored procedures, and data replication.
- **"Average 3X" performance improvement.** IBM claims that the DB2/400 V3R1 performance is improved up to 20 times for especially complex queries over the previous OS/400 data manager, and about 3 times for most types of work. (Note, however, that these claims are relative to the previous data manager with SQL/400, which generated a large amount of overhead).

In the past, IBM has been able to use the integrated nature of its OS/400 database as a differentiator; it has not been able to differentiate the AS/400 with the capabilities of the OS/400 database manager.

However, as a result of these improvements, the OS/400 database manager provides functional parity with leading third-party database managers. The combination of capability, compatibility, low cost, and ease-of-use will be very attractive to existing customers. Moreover, the AS/400's competitive position against leading Unix suppliers that feature third-party database managers is improved significantly. Of course, maintaining parity with the database management market will remain a challenge for the AS/400. IBM has stated that its DB2/400 database technology directions henceforth will be based on SQL.

New User-Based Pricing

IBM has changed its tiered pricing structure for most AS/400 software to a combined processor performance and user-based pricing format. IBM was confronted with two somewhat conflicting challenges. The first issue was the pressure from customers, especially those with few AS/400 users, who felt that it was unfair to be charged for software regardless of the number of users on the system. The second challenge was that IBM was not always gaining additional software revenue because many customers waited for newer models within the same software group to avoid any additional software charges. To resolve these problems IBM revamped its pricing structure to one that should be deemed equitable by most customers while at the same time consistently generate revenue for IBM.

What Is Different about User-Based Pricing?

The changes to IBM's AS/400 software pricing affect the way customers upgrade or purchase AS/400s and the related software. The new structure is relevant to Version 3 only. The previous pricing structure remains unchanged for any hardware upgrades made where the customer for some reason stays with earlier versions of the operating system (OS/400). User-based pricing has been changed from tiered pricing in the following ways:

- Number of software groups reduced. Nineteen software groups have been reduced to four groups. The nineteen groups were defined by AS/400 processor type.
- More options. Customers previously paid a flat fee for the operating system whenever upgrading or purchasing a system regardless of the number of users.
- A minimum base charge that includes one user — IBM has set a value for OS/400 in relation to the size and capabilities of the machine — which varies by group.
- A $/user fee — a flat rate across the four groups.
- A maximum number of users charge, which also varies by group. Instead of paying a $/user fee, a customer can pay a maximum charge and add as many users onto the system as necessary. The customer will be charged only for the number of users that exceed this maximum when upgrading to a different software group. This maximum charge is essentially like the flat-rate (unlimited-user) fee of the old price structure.
- Version charges. IBM will now charge AS/400 customers to get new versions of the operating system (OS/400). IBM recommends upgrading to the new version before migrating to the newly announced systems. This version-to-version charge is determined in the following manner:
  - A one-time charge of 10% of one of the four base-charge categories ($500 to $25,000) upgraded to — e.g., if Version 3 is to be put on a model D35, then the customer pays 10% of the $500 base charge ($50).
  - A discounted rate of 10% of $/user rate ($400) times the number of users. If the D35 user has 15 users, then an additional charge of $600 will be added to the one-time charge of $50. This discounted rate is available only for the version-to-version change. Therefore, customers must decide

how many users they think will actually end up using the system or pay the full rate ($400) every time a user is added up, to the maximum number of users.

"Unixizing" OS/400: The New Merchandising Strategy

On the technology front, IBM is taking an aggressive stance to get Unix applications on the AS/400. By analyzing 60 leading Unix applications, IBM determined that the majority of application program interfaces (APIs) were SPEC 1170 based. Adherence to these APIs can mean the difference between recompiling and rewriting. IBM estimates that the AS/400 is at approximately 70% adherence to these standards with the introduction of 150 new open APIs including Posix File System and Berkeley Sockets. Some Unix developers have already begun work on porting their applications, but it will be some time before IBM achieves its goal to have major Unix applications running on the AS/400.

Additionally, the company is launching a new worldwide merchandising campaign intended to modernize the AS/400's image.

Futures

Next year, IBM will likely introduce the full 64-bit Power architecture into the AS/400 Advanced Series. All non-B models of the AS/400 will be upgradable to the Power-based family. The performance range of the new machines will be increased fivefold — a dramatic improvement. The AS/400 product range could cover a 125x performance range. Price/performance improvements should equal or exceed the improvement levels announced here.

Additionally, it appears that the AS/400 will utilize an even greater proportion of the total processing power in the system by running additional types of work on the IOPs. Of particular interest are plans to offload some types of complex query processing.

Finally, it appears that IBM will continue to heavily invest in client/server processing and networking technologies. This means even greater performance improvements for TCP/IP environments and aggressive moves to enhance NetWare interoperability.

Conclusions

IBM defines investment protection primarily through the maintenance of a serial number, which is assigned to the platform (e.g., 9402, 9404, or 9406), and to some extent in the ability to migrate features, peripherals, and applications. With this announcement, IBM has met this protection by allowing serial numbers to carry over from most AS/400s. Conceptually, people who buy the AS/400 advanced system will have investment protection because new RISC-based processor features will fit into the existing cabinet — which begs the question, How long will the existing cabinet be supported? IBM representatives have said the new cabinets are meant to support new technology at least until the year 2000. The cabinets can support 400MHz to 500MHz. By 1997 we can expect to see top-end performance on the AS/400 grow by at least 500% over existing systems.

IBM has just repackaged its old AS/400 processor technology and called it the new AS/400 Advanced Series. Much of the price/performance improvements comes from a reduction in pricing. However, if IBM came out with only G models, there was a good chance that new business sales would stall because customers would not invest in a system configuration that would be replaced one year later. If a cabinet that fits future processors is used, migration fears are generally allayed. Application migration becomes the next issue, and IBM is on record for saying existing applications are expected to convert smoothly. This is likely a valid claim for the majority of AS/400 customers as was the case for S/38 migrations to the AS/400.

IBM's upgrade business remains at issue. For many customers contemplating an upgrade, the decision depends on a number of previously mentioned issues. F-model upgrades will still be available, at least through 1994. This option may make sense for many users — especially those customers that have a great deal of investment in the older technology. IBM

may give exceptional offers to upgrade to an F-model, especially since it does not want to lose business to the secondary market. In an attempt to better manage its installed base, IBM will be looking to provide alternatives to users to keep them from going to the secondary market for used equipment.

Users also need to evaluate how much of a trade-off there is for remaining with their existing system rather than attaining the added benefit of the new systems. The main benefits from upgrading to the new Advanced AS/400 Series focus on space savings, performance increases, a platform for the future, and possibly better reliability. Some of these benefits can be achieved with the replaced F-models — for the right price. Many of the features announced (OS/400 V3, DB2/400, Client Access/400, File Server I/O Processor and Wireless LAN Adapter) will also work on existing AS/400s.

Upgrade pricing appears to be aggressive enough, including incentives to migrate the system and update OS/400 simultaneously, to convince many users that now is the time to migrate. With the new pricing structure, IBM will generate revenue whether a customer chooses to upgrade to an F or an advanced series, or just get the new version.

On the whole, upgrade business to the new systems should be brisk although many existing customers may find that the F-models serve their purpose well. The price/performance levels combined with new user-based pricing for software in many instances will make the AS/400 more competitive. An aggressive sales and marketing campaign will need to be implemented over the next six months.

IBM Agreement with Beijing to Develop IT Infrastructure:

Do "Golden Projects" Mean Golden Opportunity for Big Blue?

IBM and China's Ministry of Electronics Industry have announced a broad agreement on several IT projects. They will collaborate on supporting China's "Golden Projects" — national networks for information exchange, banking and financial services, electronic mail, and taxes. IBM will provide products and consulting services. It will also establish a software development office in Shanghai plus three open-system networking centers. China also asked IBM to accelerate the introduction of PowerPC technology. The most important aspect of this announcement will be the long-term revenue opportunity for IBM. The company will be installing prototype systems in 12–18 months; revenue should pick up thereafter.

The announcement represents a significant long-term revenue opportunity for IBM and is tangible evidence of management's intention to address new (for IBM) market segments even as the company downsizes elsewhere. Highlights include the following items:

- IBM and the government of the People's Republic of China signed a "memorandum of understanding" covering a range of technology and development issues. No specific contracts have yet been signed.
- The first commitment establishes a networking joint venture between IBM China Company, Ltd., and Ji Tong Communications Company, Ltd., affiliated with the Ministry of Electronics Industry (MEI). Based in Beijing, this venture will produce advanced networking and related technologies to support the Golden Bridge Project. This is China's plan for building a national information network. It will connect all the State Council's ministries and commissions with 30 provincial capitals, 500 major cities, and 12,000 large- and

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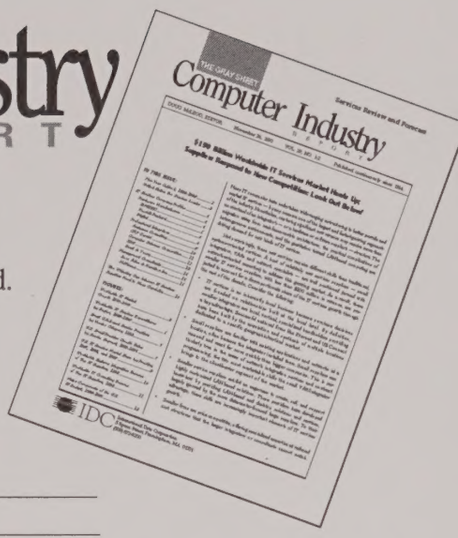

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medium-sized enterprises. The network will eventually support voice, graphics and data.

- IBM's equity investment in the joint venture will "not be huge right now." IDC expects that IBM will end up investing several million dollars in the venture when details are finalized in the near future.
- IBM will consult with the MEI on all of the other Golden Projects, including:
  - Golden Card, the national banking and financial network that is designed to expand credit- and ATM-card payments in the PRC. The first phase of the project is already under way and will focus on 16 cities.
  - Golden Port, a national e-mail system for the exchange of foreign trade information. The project's goals are EDI and e-mail for external/internal communications, a custom accounts payable and receivable system, an import/export licensing system, and a foreign trade information management system.
  - Golden Tax, the project to computerize "hundreds of thousands" of tax collecting units. It will eventually be internetworked with banking organizations to improve the circulation of currency in the PRC. This project will be jointly financed by MEI and the Ministry of Finance.
- IBM has agreed to establish a software development center and three open-system networking centers in Beijing, Shanghai, and Guangzhou. The software center will focus on the development of software for domestic PRC use and for export. The networking centers will assist Chinese users in evaluating and developing client/server solutions.
- IBM's PowerPC technology has been chosen by the MEI as one key microprocessor technology of the future. IBM and MEI have agreed to introduce PowerPC technology into the Chinese market and will jointly develop Chinese language software the exploits the PowerPC platform.
- Finally, this announcement is the result of the involvement of top IBM management. Both Louis Gerstner and Ned Lautenbach, V.P. of international operations, have invested significant time in developing IBM's business in the PRC. Gerstner met with Chinese President Jiang Zemin in March.

In the long run, IBM's opportunity is huge. China accounts for approximately 20% of the world's population and 10% of the worldwide economy. Despite its growing economy, China is currently responsible for only 2% of the worldwide IT market. The unprecedented growth of the Chinese economy will drive that proportion far higher in the next decade.

In addition, this announcement further solidifies IBM's previous investments in the PRC. IBM jointly owns an assembly plant with a Chinese company, Great Wall. It has several other, smaller investments in the PRC. With this announcement, IBM puts some distance between itself and its competitors. Dell and Compaq are among the major PC companies with manufacturing facilities in the PRC. Intel assembles 386s there. Apple opened its first office in Beijing less than a year ago, but has recently unveiled ambitious plans for expansion.

Several other considerations are noteworthy. Selected individual contracts with Chinese customers like financial institutions will be of greater short-term importance for IBM. IDC does not expect the IBM China Company's involvement with the "Golden Projects" to produce significant financial benefits for at least another year, and possibly for two or three. It may, however, raise IBM's profile in less-visible semi-private sector tenders. The recent sale of 40 ES/9000s, 100 AS/400s, and 2,000 PS/2s to one of China's four largest banks may be just the beginning.

The agreement is a disappointment for IBM's competitors, Digital Equipment and Bull. Both vendors expressed interest in the projects, although probably at lower levels in the Chinese political hierarchy than IBM.

The agreement indicates how quickly the Ministry of Electronics Industry has rerisen after it was disbanded in 1988 and then reformed in 1993. Bidders for future government contracts will need to include it in their planning.

Finally, the joint venture is not without potential stumbling blocks for IBM; several issues will have a significant impact on the potential profitability of this agreement for IBM, including the following:

- **Trade status** — If President Clinton and Congress cannot agree to grant the PRC Most Favored Nation status in early June as hoped, trade with China will be under greater scrutiny. Such a move would likely push the potential benefits of this announcement out as much as several more years.
- **Political stability** — All levels of the Chinese government seem intent on broadening relations with the West, and Westernizing the Chinese economy. However, even a minor power shift and the resulting ideological changes could greatly exaggerate IBM's risk and/or reduce the potential up side.
- **Staffing** — Increasing staff levels in a Communist country entails providing a significant level of services that are typically provided by the government. Failure to hit a steep employment ramp may hinder IBM China's efforts to grow.
- **Competition** — IBM was among the first major IT suppliers to arrive in China with significant resources and a clear commitment. However, it is likely that other suppliers will win major portions of Golden contracts. Should they outperform IBM, this relationship may not live up to its potential.

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Opportunities in the Asia/Pacific IT Market

The Asia/Pacific (A/P) IT market has seen strong growth over the past few years, driven by the rapid economic expansion of several countries, most notably the "four tigers": Korea, Singapore, Taiwan, and Hong Kong. Overall, the A/P region represents a significant opportunity for IT suppliers, despite and because of its diversity.

The diversity is striking. On the one hand, the individual economies of the A/P range from highly Westernized to practically undeveloped. Japan is the largest and most solid A/P country.

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Despite considerable retrenching over the past two years, Japan appears ready to return to at least modest growth soon.

The four tiger countries are smaller and more rapidly growing IT markets. Long-term sustainable economic growth, which will in turn drive opportunity for IT suppliers, appears likely in these countries. Finally, the emergence over the long term of one or several of the A/P region's less-developed countries, most notably the PRC, may provide a very significant opportunity for IT suppliers. No single investment strategy is or will be successful across such diversity. No IT supplier has developed a single business model for successfully competing in all of the countries of the region.

And yet as a whole the countries of the A/P region mesh quite nicely. Taken together they provide a very attractive mix of predictable return and long-term, riskier opportunity. As a result, the region is the most important emerging market for IT suppliers (compared to other developing regions: Latin America, Eastern Europe, and Africa/Middle East/India). This issue of *The Gray Sheet* reviews the development of the A/P IT market and provides an analysis of its outlook over the next 12 months.

Japan

Japan accounts for 80% of the A/P IT market; as a result, as Japan goes, so goes the entire A/P region. Although other countries in the region may grow rapidly, a small drop in the Japanese IT market can offset their gains very quickly.

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Historically, Japanese vendors have focused on two strategic goals: plug compatibility for multiuser systems and penetration of the domestic market though well-defined and developed distribution channels. In addition, the country's Kiretsu relationships provided captive markets based on cross holdings or long-term proprietary technology relationships.

Because computing in Japan has been characterized by large central processing departments using in-house-developed local language software, this model worked quite well through the boom of the 1980s. Economic growth and the general business climate were strong. The banking/finance and manufacturing sectors were responsible for much of the IT industry's revenue growth.

However, over the past several years this model has presented problems for the Japanese vendors. As the economy cooled down and the bubble burst, Japanese suppliers have become much less competitive from a worldwide perspective.

The majority of Japanese vendors' revenue comes from the domestic market. On the other hand, U.S.-based vendors derive revenue in a proportion that more closely mirrors overall lines of geographic opportunity. IBM, HP, and Digital all realize more than 50% of their revenue from outside the United States; not coincidentally all are well positioned to tap new markets as they develop. Had a greater focus been placed on external markets during the fat years, Japanese vendors might be able to challenge U.S. vendors more effectively than they are currently demonstrating.

At the low end of the market, Japanese vendors have had a difficult time competing as well, except in their own market. Time-to-market and the development of global volume channels for PCs and workstations have been major weaknesses with few exceptions.

The lack of a PC standard in Japan has also constrained development of the competitive environment that fuels innovation. Startups in Silicon Valley and other places in the United States have been key drivers to bringing new products to market and keeping larger competitors on their toes. There is a conspicuous lack of startup activity in Japan, and though technology R&D spending is high, it tends to result in strong components rather than finished products to the international market.

As more value moves to software and services and hardware prices continue to drop, the pressure will remain very high for continuous innovation and volume production for Japanese vendors to maintain position.

In summary, the Japanese market is, at $65B, the second largest IT market in the world. In the past, competition from entrenched players in this unique environment has been very intense. In the past, the lack of the competitive environment that drives U.S. vendors to innovation and price consciousness has insulated the Japanese market.

However, the industry's new low-cost structure will make the Japanese vendors increasingly less competitive without major reorganization. Several shifts over the next few years will force Japanese vendors to adjust their domestic strategies, thereby offering opportunity to U.S.-based vendors.

Movement to Open Systems

As was the case in the United States, Unix will begin to put increasing price/performance pressure on commercial systems vendors in Japan. While the market will still remain vendor driven, both NEC's and Fujitsu's aggressive moves into Unix signal new competition in this segment, as well as major vendor endorsements of Unix in the commercial environment.

U.S. vendor market shares for Unix in Japan, most particularly for workstations in technical applications, are relatively high. Sun and Hewlett-Packard are both strong. HP has seen success in penetrating commercial accounts for Unix midrange systems; it has a particularly strong outlook into the mid-1990s.

Commercial Unix is still not a heavyweight contender in Japan, but it is a segment that will see fast growth, especially as the Japanese vendors become proactive. Although large accounts offer big IT opportunity, there will also be a significant layer of it among medium-sized companies, which will be leading adopters of commercial Unix technology. The transition will be less painful, and major DP decisions will be made without heavy investment in proprietary technologies. Many U.S. vendors already understand the Unix game very well, and the challenge will be applying it to the Japanese market. The reverse is true for major Japanese players.

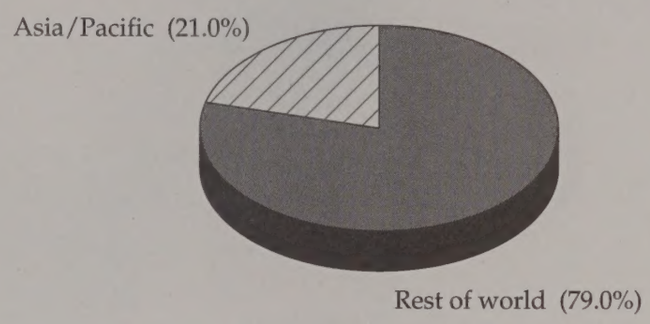
Standardization of the Japanese PC Market

The lack of a PC standard in Japan has had a large impact on overall IT spending. This market is skewed toward the high end, compared to other developed IT markets. In addition, the Japanese PC market is highly fragmented.

As Japan moves to the DOS-V standard, IDC expects the PC market to gain momentum. Portability will ease the introduction of new applications and will increase the scale of the software opportunity in Japan. The effects of U.S. competition have been more profound than at the systems level (except for IBM, which has traditionally been a major player in Japan). Apple is the largest market shareholder after NEC in the Japanese PC market; Dell and Compaq have also shown very good year-to-year growth. NEC, the largest domestic manufacturer, has lost market share despite significantly lowering prices.

Microsoft's long-term view of the Japanese market will also pay off as the market standardizes. The high-volume strategy used by some U.S. PC vendors has lowered prices, fueling demand and leading to a growing retail channel. This situation will mean more home usage, helping to grow the multimedia software and hardware add-on segments of the market.

Worldwide IT Spending, Asia/Pacific vs. Rest of World, 1993



Total = $380 billion

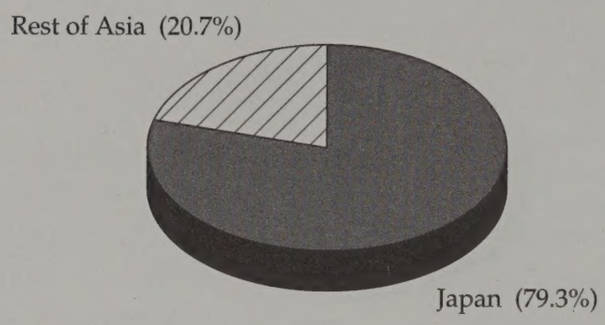
Source: International Data Corporation, 1994

Movement to Networking

As the desktop market grows in Japan, strong growth in the local area network software and equipment market will follow. This growth will affect the balance of power from a central DP level, where distributed processing will empower departmental users, reinforcing desktop and software growth. Given that it is unlikely for the balance of power to shift radically, the internetwork market segment should also show fast growth as DP managers bring local area networks together into the central system. There are some constraints to this growth, such as skill-set availability, causing the growth to occur slowly.

In summary, significant opportunity for U.S. vendors lies in the following areas: Unix technical and commercial segments, PCs, PC software, and LAN and internetworking software and equipment. Inroads to the higher end of the market will remain difficult as Japanese vendors try to maintain market share and revenue in their traditional strong segments.

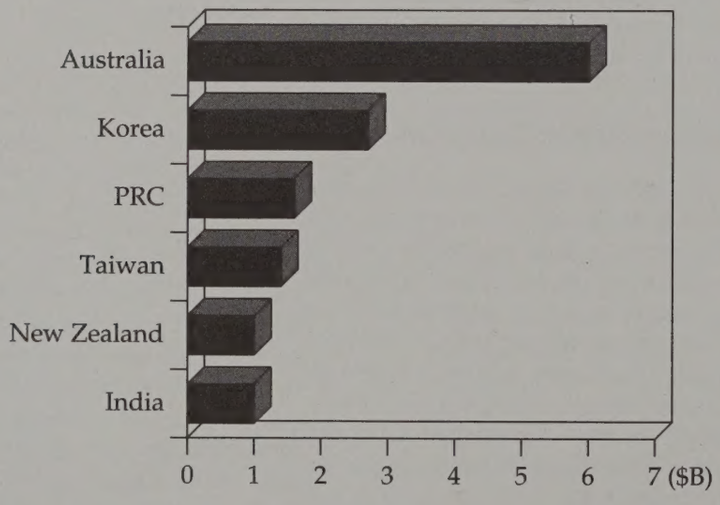
Asia/Pacific IT Spending, Japan vs. Rest of Asia, 1993



Total = $82.7 billion

Source: International Data Corporation, 1994

Asia IT Market Spending by Country, 1993



Source: International Data Corporation, 1994

The Four Dragons: Korea, Taiwan, Singapore, and Hong Kong

Adoption of IT within the four dragon countries (excluding Hong Kong, which is an anomaly both politically and economically) has been greatly influenced by the rapid economic development of the region. Each market is unique, and each has benefited from the overall prosperity.

For example, the Korean economy moved quickly in the mid-1980s to become a global force in several markets. Some companies in heavy industries like steel and shipbuilding moved into the top five global positions almost overnight. This success was well orchestrated from the top and involved division of markets, access to practically unlimited capital, and wage control. The success of these measures is undeniable, even if the strategy is no longer viable.

Korea's economic growth resulted in a large redistribution of wealth. It fueled the growth of IT requirements for all of the large companies (chaebols), which were multibillion dollar companies playing hardball in international markets. In addition, small- and medium-sized companies that wanted to emulate the success of the larger ones had access to capital for expansion.

In Taiwan the scale of business is not as large as in Korea, but economic growth has been equally impressive. A myriad of small manufacturing companies is driving per-capita GDP rates even higher than those of Korea. This situation has created strong demand for IT products. The same can be said for Singapore.

Two Drivers: Local Production and Government Involvement

Two major factors drive the IT market in all of these countries: local production (on a brand, OEM, or component-level basis), and the role of the government in national IT policy. For example, Korea has a very large conglomerate-based economic structure (similar to that of Japan), creating a large commercial account base. Each of these conglomerates is involved in all areas of IT and has large captive markets for its own products and services.

In Korea, Singapore, and Taiwan the governments are the key buyers of IT products and services. Each government has a relatively high degree of top-down control in terms of standards, local content, R&D direction, market access, capital allocation, and overall national IT objectives.

In Korea this policy has sometimes backfired: the PC market was closed for a long time and quickly became noncompetitive. As a result, it is no longer an export force. A lesson has been illustrated not only in the protection of local markets, but also in overall productivity. Once the market was opened, PC prices dropped very quickly, better technology was more commonly accessible, and unit volume rose very rapidly, to the benefit of the local manufacturers who survived. This process in turn fueled local language software production and got the technology into the hands of a broad base of customers.

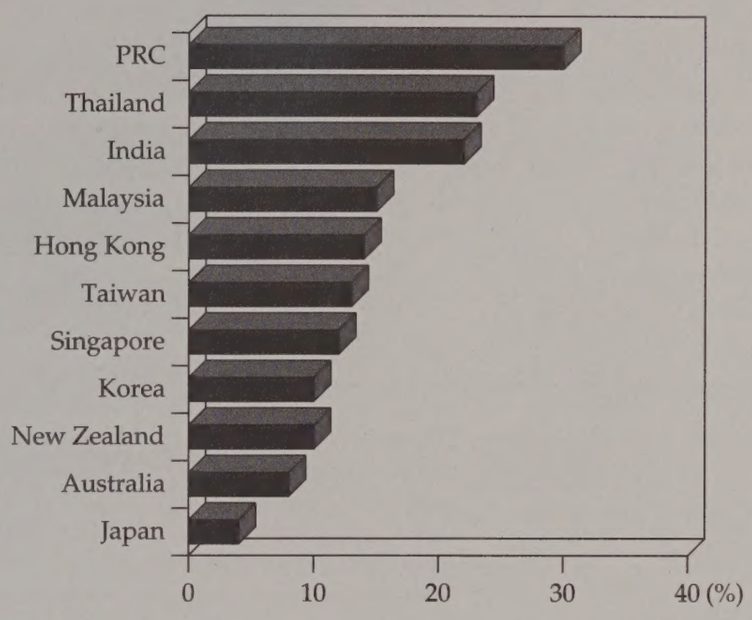
The result of the opening to competition was that the overall economy was more productive across many industries. Keeping technology markets closed in order to protect a handful of local players will eventually affect the overall economy across a variety of industries. This is especially true where local companies are competing at the international level, where competitive advantage is defined in terms of time and efficiency.

In Taiwan smaller and more nimble companies have become the export engine for PCs and components/peripherals despite size and scale differences that made the Korean companies strong during the late 1980s. Taiwanese PC companies are quick to move into new product areas; they understand that time-to-market in the IT business is a critical success factor. The ability of Taiwanese companies to respond so quickly has been advantageous for all the companies that source from Taiwan as well as the Taiwanese themselves.

Similarly, Singapore has become a world-class manufacturing center for printers and disk drives over the past five years, and as a regional distribution center with strong infrastructure, located around emerging ASEAN markets, it is very well positioned for future growth.

Generally, national IT policy has had a positive effect on these economies. Despite the PC export problems, Korea has developed and manufactured its own digital switching system, high- and low-end multiprocessing Unix-based midrange systems. It OEMs PA-RISC chips and low-end workstations from Hewlett-Packard and is a global force in DRAM production and consumer electronics. In the newly industrialized economies, some factors will lead to opportunity for U.S. vendors, among them infrastructure development, dropping PC prices, expanding software opportunity, and LAN growth.

Asia/Pacific IT Market Growth by Country, 1992–1997 CAGRs



Source: International Data Corporation, 1994

Infrastructure Development

Each of these countries has seen very rapid economic growth. In most cases investment in infrastructure has lagged. Whether roads, bridges, airports, telecommunications, high-speed trains, or national data networks (information highway development), each of these countries now has major infrastructure projects under way, and they involve high levels of IT expenditure.

This is especially true of the Chinese-speaking countries (Taiwan, Singapore, and Hong Kong), which see long-term cooperation with China. They seek to become a staging area for expansion across consumer markets in the PRC and feel such a move is vital to their long-term growth.

Comparative Strength of IT Industry and Infrastructure in Four Asian Countries

	Japan	Korea	Taiwan	Singapore
Adoption	Mature	Medium	Desktop	Medium
Manufacturing	Strong	Medium	Low end	Medium
Focus	Domestic	Domestic	Export	Export
Buying	Local	Local	Local	Import
Multinational	Weak/medium	Strong/weak	Strong/weak	Strong
Geography	Dispersed	Concentrated	Concentrated	One city
Industries	Diverse	Diverse	Manufacturing	Middle
1993 IT Market ($B)	65.5	2.8	1.5	0.8

Source: International Data Corporation, 1994

These countries also continually need to be more competitive in manufacturing and to move to high-end products to offset wage growth. The result will be continued strong growth in technical workstations and medium-scale systems, the latter of which have already begun to replace traditional mainframes that would have gone into these projects.

Less-Expensive PCs and Expanding Availability of Localized Software

In Korea and Taiwan, several of the major competitors in the PC market have a vested interest in seeing domestic growth, and in Korea some have substantial captive markets to which they can sell. A rapidly growing installed base of desktop systems will fuel printer and software sales. The IT market in these countries is already significantly more weighted to desktop systems than in the United States, at over 50% of spending in some cases.

IDC believes the PC and printer markets will continue to outperform the systems market, gaining share of the total IT market, with the exception of small-scale Unix systems, which have momentum growing from a smaller base. Databases and database applications are driving the sales of these systems and are also an area of growth.

Adoption of Local Area Networks

IDC expects strong growth in local area networking across each of the newly industrialized economies (NIEs). This growth is expected to be broad based and involve the larger customers who will be decentralizing as in Japan but more quickly, and among new small and growing medium business segments. Opportunity for network S/W, NICs, routers, and hubs is expected to grow faster than the overall market for several years to come. We are seeing some traditional volume channels, particularly outbound dealers, starting to focus on accounts rather than one-off sales and adding value at a higher level than simple hardware configuration and moving into network configuration and software implementation.

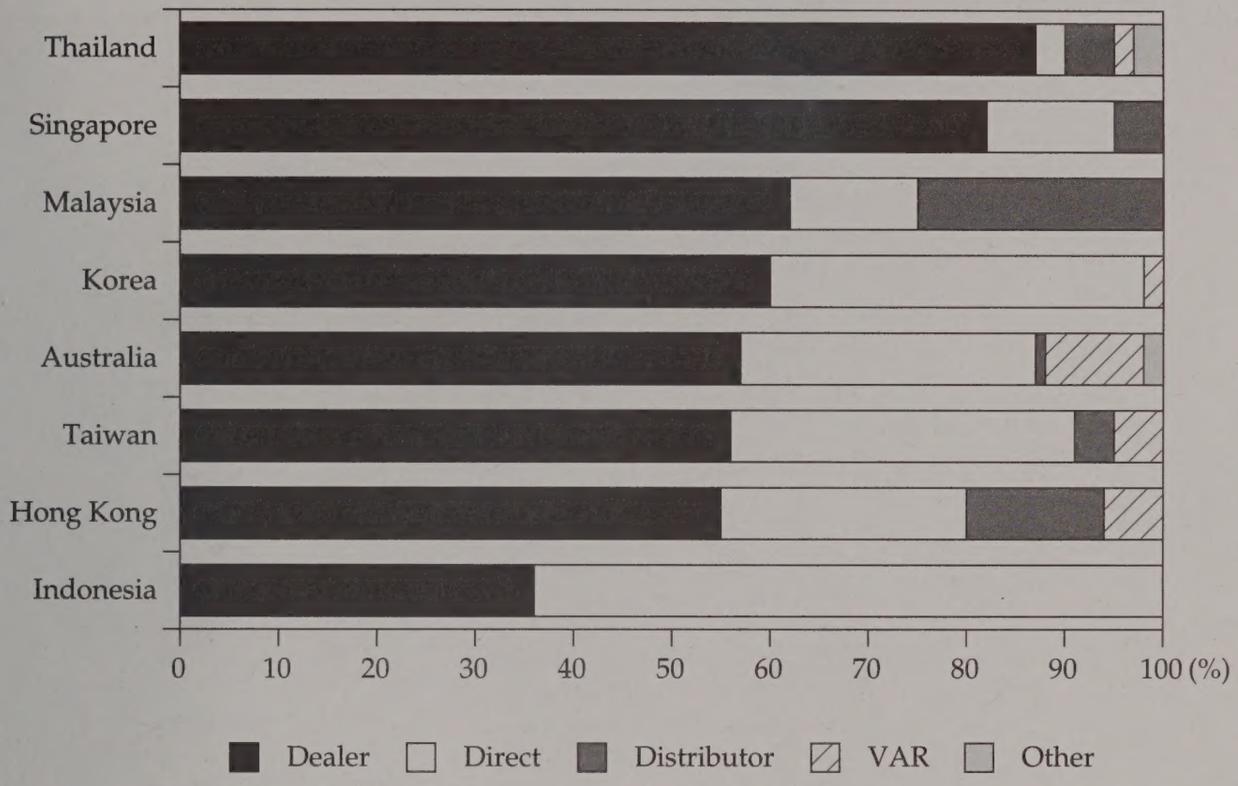
Emerging Economies

The emerging markets of the PRC, Malaysia, Indonesia, Thailand, India, and the Philippines are growing at a very fast rate across most product lines from a small base. GDP levels are growing quickly, and large interregional investment from Japan, Taiwan, Hong Kong, and Korea is fueling the manufacturing sectors.

These relatively new Asian investors are well financed and should not be underestimated, especially in the PRC. The lessons learned in achieving volume production with low wage rates are applicable for all countries in the region.

All of these emerging countries will adopt a combination of strategies that their counterparts, the NIEs, used successfully in the 1970s and 1980s. Achieving this comparative cost advantage in IT production with an export focus is the

Asian Distribution Channels for Desktop PCs by Country, 1992



Source: International Data Corporation, 1994

first step in acquiring technology transfer and getting large volumes of product into the domestic market. We have seen this in both Korea and Taiwan, which are the most likely to be emulated due to export or OEM focus in the initial stages.

Additionally, the Hong Kong economic structure is and will forever be different from any of the emerging countries, even if some of the Hong Kong billionaires are looking long term at the PRC. The Singapore model would seem very difficult to emulate over large geographies and population bases. That is not to say that certain policies might not be adopted from these countries, but that the general approach seems more practical from a Taiwan/Korea perspective.

Desktop components are widely available and not expensive. OEM or knock-down assembly business will help these markets start achieving volumes. Only with volume can certain things happen, like investment in local language software, which drives adoption across a broad base. In certain cases there are constraints to adoption of IT inherent in the structure of language and how it is written. This is most apparent in Chinese-speaking countries, where handwritten forms and notes still dominate the office environment.

Whether this can be overcome more quickly with emerging imaging, OCR, or voice recognition technologies remains to be seen, but these markets will not go through a mainframe-mini-LAN transition. The opportunity is already at the desktop and local area network level. As with the NIEs, infrastructure building and national automation will be a key driver of IT markets over the next few years at least. There will be mainframe-class systems shipped, and the multiuser systems market will also grow, but the volume in most of these markets is small, and generally speaking the systems are less highly configured, making the focus definitely low end. The public sector is always large in these markets and swings market share significantly with contract awards.

PRC: Opportunity . . . Long-Term Opportunity

The IT market in the PRC offers huge potential in the long term. However, it will be neither very large nor very lucrative over the next few years. Companies that sell PCs and know how to compete in an extremely price-competitive market (where distribution channels have yet to be developed) will be the first to succeed. Consider the following:

- Per-capita spending on IT in the PRC is less than $2. It is $545 in Japan.
- Telephone penetration in China is two per hundred population.
- Average annual per-capita income in China is $300.
- Finally, the PRC IT market is composed of almost two-thirds PCs, with less than 5% software and services. The Japanese market is much closer to a 50%/50% split between hardware and software/services. Many international suppliers seek to exploit the software and services market. It will be some time before the perceived value of these is on a par with more mature markets.

The PRC market is without doubt the A/P region's most interesting and important long-term market. The right combination of GDP, infrastructure, and local production will produce an explosion. The $64,000 question is when. It will take at least a couple more years, and perhaps closer to 10 more. IT vendors will be in the second wave to benefit; manufacturers of consumer goods and fast-moving consumables will catch the first.

The market in the PRC (and several other emerging economies) will be centered on fast PC growth. Pockets of opportunity for systems vendors will emerge. Channels to sell and support high-end hardware will take a long time to develop. Considerable difficulties in local language requirements and support to key industrial sites, which were dispersed for strategic reasons during the Cold War era, can be expected.

Opportunities for U.S. vendors in the emerging economies are centered around volume products like PCs. Physical and economic infrastructure, particularly telecommunications, banking, finance, and manufacturing, are segments that will grow very quickly with the overall development of the countries. These will offer significant opportunity to U.S. and international systems vendors.

— This article was written for The Gray Sheet *by Davis Blair, IDC's vice-president for the Asia Pacific region.*

THE GRAY SHEET
Computer Industry
REPORT

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The Novell/WordPerfect Merger: Impact Extends Beyond Utah

The immediate fallout from the latest development in the consolidation of the packaged software industry is primarily a process of combining and realigning products and strategies. However, Novell's recently completed purchase of the WordPerfect Corporation and Borland's Quattro Pro spreadsheet product will have long-lasting repercussions for competitors in a wide range of desktop software segments: applications, workgroup products and office solutions.

For Novell the purchases are the latest steps in an aggressive pattern of acquisitions over the past two years (see page 3); this is the most significant. The combined entity of WordPerfect and Novell will have specific applications-oriented impact in three primary areas: workgroup, office suites, and the standalone desktop applications market.

June 10, 1994 Vol. 29, No. 15

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The Workgroup Focus

From Novell president and CEO Ray Noorda's point of view, the rationale behind the acquisition focused on "redefining the applications business by helping drive the growing market transition to network applications . . . Novell's objective is to accelerate this market transition by offering new generations of network applications."

Up to now, Novell has made several attempts in the electronic messaging arena with little success. Its MHS and Global MHS products were mismarketed, mispriced, and technical underachievers. The product problems were compounded by the underlying suspicion that Novell had not decided whether to lay a foundation for communications applications that third parties would provide or to provide the actual applications and services itself. With this acquisition, Novell will gain two shipping products (WordPerfect Office and SoftSolutions Document Manager) as well as expertise in networked applications.

WordPerfect Office

Novell's purchase of WordPerfect gives it a ready-made entrée into the messaging market, a market in which Novell has stumbled over the past three years despite its enviable position of "owning"

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the platform — the LAN — for this burgeoning market segment. The acquisition of WordPerfect Office, a combined electronic mail, scheduling, forms, and routing workgroup suite, puts Novell in the LAN e-mail fracas with Microsoft Mail and Lotus's cc:Mail. We put WordPerfect Office in a distant but clear third position in the LAN e-mail market (behind Lotus and Microsoft), with just less than 10% of revenues.

As the LAN e-mail market share race heats up, with Microsoft and Lotus together taking more than 50% of the revenue and user-base market share for 1993, we believe Novell's purchase of WordPerfect happened in the nick of time. Over the past two years, WordPerfect has not managed to gain enough market share with its WordPerfect Office product to make even a dent in Lotus's and Microsoft's e-mail momentum. One of the problems WordPerfect faced was the lack of a robust back-end strategy. Although the WordPerfect Office 4.0 product has received kudos for successfully integrating forms, e-mail, calendaring, and scheduling at an e-mail-only price, it fell short of delivering a scalable open back end.

There are several issues associated with the WordPerfect Office back end. The current product uses its own messaging transport, and WordPerfect has not publicly announced a native X.400 strategy. The current product is a time-share architecture, rather than the more flexible client/server architectures announced (although not yet delivered) in the forms of Touchdown and EMS from Microsoft and Lotus's LCS (Lotus Communication Server). Finally, WordPerfect Office has no announced strategy related to replicated object storage, the foundation of Notes. Thus, how quickly WordPerfect can bring these pieces up to spec remains to be seen and is a cornerstone for Novell's potential success in the workgroup market.

WordPerfect Office stands to gain the benefits of Novell's strong reseller channel, which will provide additional new channel capacity to buoy WordPerfect's own direct sales and dealer/distributor channels. For Novell resellers, it rounds out the potential offerings it has for customers, allowing for a single-source supplier for network, personal productivity applications, and desktop applications.

SoftSolutions

In addition to WordPerfect Office, Novell will gain another workgroup application — document management — courtesy of WordPerfect's recent acquisition of SoftSolutions. Document management is a strategic workgroup application, one in which we expect to see growth reminiscent of the doubling e-mail units over the past four years.

SoftSolutions' document management capability will allow Novell to release key document management functionality at the network operating system level, a logical place for some of the fundamentals such as document search and retrieval and security, as well as to provide "above the OS" document management applications. Although the company currently still has plans to remain cross platform, supporting not only NetWare but also LAN Manager, Unix, and NT, the key advantage is the potential integration of document management with the NetWare directory and other NetWare services.

There have been what we believe to be well-founded rumors that Novell, with a partner, would enter the document management market in the near term. However, this merger clearly puts any other potential relationships on thin ice.

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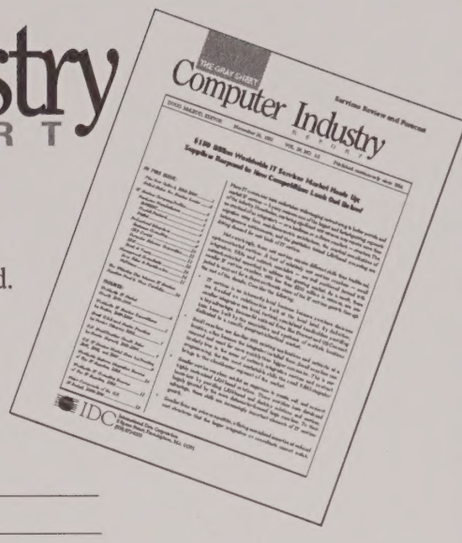

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One key to the success of this merger will be if Novell allows WordPerfect to take the leadership role in the communications products area. Despite some current product shortcomings, there is a great depth of understanding of networked computing and document management within the WordPerfect Office group and the SoftSolutions division, and Novell should take full advantage of it. Novell has been successful at making networked PCs a reality; WordPerfect and SoftSolutions understand what it will take to make collaborative end-user computing a key revenue generator for Novell.

The Suite Business

A second impact of this merger and acquisition will be in the suite business. With both WordPerfect, a leading word processor with a loyal following, and Quattro Pro, a top spreadsheet now under Novell's control, as well as the conveyance of 1 million shares of Paradox, Novell now owns an offering in the runaway desktop suite category. Since mid-1993, the WordPerfect/Quattro Pro/Paradox combination has been marketed by Borland as the Borland Office. The product had only a 4% 1993 worldwide shipment share and was a distant third behind Microsoft Office and Lotus's SmartSuite in 1993. Borland Office has been plagued by confusion surrounding the long-term viability of the offering, which could be somewhat alleviated under Novell's control. However, in the broader applications market, we believe the suite business is a plug in the dike to provide immediate revenues while preparations are made for the watershed of the workgroup market.

Integration is one of the most frequently cited reasons for the purchase of a particular suite product. Although the Borland Office has a best-of-breed message and a significantly lower price than the other two major suites, it failed to achieve more than 4.3% of shipments during 1993.

However, recent meetings between Novell and WordPerfect reveal that promising collaboration has already transpired between the two companies in the short two months since the acquisition.

The tables on page 5 illustrate 1993 market share for office suite products as well as their standalone components. From an office suite perspective, Microsoft clearly dominated this market; Lotus was second, and the combination of Borland and WordPerfect was a distant third. Additionally, Quattro Pro is the third-ranked spreadsheet in the market with 15.9% of shipments.

Novell's Recent Acquisitions

Date	Acquisition	Price ($)
June 1991	Digital Research	135.0M
April 1992	International Business Software	5.2M
May 1992	Annatek Systems	10.0M
December 1992	Unix Systems Lab	322.0M
January 1993	Hyperdesk	—
June 1993	Software Transformation	21.8M
June 1993	Serius	18.0M
June 1993	Fluent	17.5M
March 1994	WordPerfect	1.4B
March 1994	Quattro Pro (Borland)	145.0M

Source: International Data Corporation, 1994

The Desktop Applications Focus

From a desktop applications perspective, this merger represents an entirely new foray for Novell. We believe that the outlook for WordPerfect's standalone product sales is not significantly impacted by this announcement. With perhaps a few minor diversions, this merger won't inherently give WordPerfect any new opportunities in selling products. WordPerfect is currently engaged in migrating approximately 7.7 million users of its DOS-based product to Windows-based products. Although WordPerfect sold 1.8 million units of WordPerfect for DOS in 1993, the DOS market is declining, and Microsoft Word maintained the leadership position on the Windows word processing platform. However, Novell's more direct conduit into corporate IS departments may over time enable it to succeed in volume purchase agreements or in winning corporate site license standard decisions.

The combination of WordPerfect Office, integrated e-mail and group scheduling,

and WordPerfect InForms forms processing product basically mimics the functionality of mainframe-based PROFS systems on PC LANs. With organizations migrating from mainframe-based e-mail applications to PC LAN environments, this combination offers a one-stop-shopping package.

DOS Word Processing Software Shipments by Product, 1993

Product	Shipments (000s)	Shipment Market Share (%)
Word Perfect for DOS	1,800	80.4
Word for DOS	150	6.7
Other	290	12.9
Total	2,240	100.0

Source: International Data Corporation, 1994

Windows Word Processing Software Shipments by Product, 1993

Product	Shipments (000s)	Shipment Market Share (%)
Word for Windows	3,500	45.5
WordPerfect for Windows	2,800	36.4
Lotus Ami Pro	1,300	16.9
WordStar for Windows	70	0.9
Other	25	0.3
Total	7,695	100.0

Source: International Data Corporation, 1994

Impact on Novell

The merger increases the potential strategic opportunity for Novell. However, Novell's success will be largely determined by how quickly it can move to reap any structural synergies of the deal and how effectively it can rid itself of the specter of past acquisitions that have fallen by the wayside.

Marketing Impact

With this acquisition, Novell can position some combination of AppWare, WordPerfect, the WordPerfect Office, the Borland Office, and its other products as a solution platform in much the same way that Microsoft's "Office Development Kit" provides enough integration capability so that Microsoft can position its desktop applications as a one-size-fits-all development tool.

An integrated single-vendor solution may be unattractive to some people, but we believe that this ability to have an integrated system software/applications market will be appealing to the majority of the buying population.

Channel Impact

This merger gives Novell an effective weapon to combat Microsoft's targeting of the Novell certified reseller base. Microsoft's aggressive moves to target Novell resellers for partners to help move its Windows NT product have diluted the value of one of Novell's key assets. By adding application products, Novell has moved toward becoming a competitive full-line supplier. This means that resellers have even more ways to make money from an individual customer, which gives Novell competitive parity with Microsoft.

Additionally, the combining of WordPerfect and Novell country offices in many countries, particularly smaller ones, may result in significant cost-of-sales reductions over time.

General Competitive Impact — Workgroup

The thrust of this merger is self-admitted by Novell to be aimed at the workgroup market and to build a "software powerhouse." The combined workgroup license revenues for WordPerfect Office and SoftSolutions were just less than $40 million in 1993, less than half of Lotus Notes' $100 million, but a clear and unchallenged second in the overall workgroup applications market. And although $40 million in revenues doesn't seem commensurate with a $1.5 billion purchase price, Novell is buying perhaps the greatest available source of workgroup potential, gaining a stake in a market we believe will grow from less than $400 million in 1993 to more than $2 billion in 1997.

In the short term, the Novell merger will not negatively affect the Notes business. Nonetheless, the expertise within WordPerfect and SoftSolutions and the tenor of the acquisition statement indicate that all guns are aimed to take a key piece of the groupware market that Notes has dominated for the past three years. The greater threat to Lotus is to its cc:Mail business because Novell has the option to bundle messaging services with the network operating system.

Lotus is floating without an operating system life boat, as Novell has with NetWare and Microsoft has with Windows and NT. And despite the positioning of Notes as a network application operating environment (which we believe is the correct positioning), Notes has barely a fraction of the critical mass of users that are committed to the Novell and Microsoft operating systems. Thus, the opportunity to bundle network services and operating systems is not as available to Lotus as to Novell and Microsoft.

Ultimately, the combination of Novell and WordPerfect will create another software giant, potentially able to compete with Microsoft. Novell now has a position in many of the key infrastructure components — desktop applications, workgroup applications, and networking operating system — that will allow it to truly challenge Microsoft.

Both Novell and WordPerfect have strong commitments to OpenDoc with its single document interface model. The combination now could potentially pose the first real challenge to Microsoft's OLE, particularly if Lotus jumps on the OpenDoc bandwagon.

Impact on Other Competitors

Impact on Borland

Novell Purchase of Quattro Pro Product

- To complement the WordPerfect product line, Novell agreed to purchase the Quattro Pro business of Borland for $145 million in cash.
- One hundred Borland employees involved in Quattro Pro development will be transferred to Novell.
- Borland will use the occasion of the sale of Quattro Pro to refocus on its role as a full-line development-tool supplier.

Borland Restructuring Announcement

- Borland announced that it will report a quarter-end and yearend loss and decline in revenues for the quarter and fiscal year ending March 31, 1994. Layoffs and restructurings are expected.
- Borland announced the resignation of CFO Alan Henricks.
- In a separate press release announcing the hiring of turnaround specialist Keith Maib as COO, Borland last week announced the resignation of senior vice president Stephen Kahn, long-time Borland executive.

Office Suite Software Shipments and Revenues by Product, 1993

Product	Shipments (000s)	Shipment Market Share (%)	Revenue ($M)	Revenue Market Share (%)
Microsoft Office	1,700	74.0	670.6	77.8
Lotus SmartSuite	500	21.7	168.4	19.6
Borland Office	100	4.3	22.1	2.6
Total	2,300	100.0	861.1	100.0

Source: International Data Corporation, 1994

Windows Spreadsheet Software Shipments by Product, 1993

Product	Shipments (000s)	Shipment Market Share (%)
Excel for Windows	3,900	48.8
1-2-3 for Windows	2,500	31.2
Quattro Pro for Windows	1,275	15.9
Improv for Windows	250	3.1
Other	80	1.0
Total	8,005	100.0

Source: International Data Corporation, 1994

- With the resignations of Kahn and Henricks, the only Borland senior vice president who has been at Borland for longer than 18 months is Richard Schwartz, chief technical officer.

Borland Engine Announcement

- Borland announced its intent to deliver a unified database management and database connectivity engine in the next releases of its Windows-based database products, which will provide a unified code base for developing new generations of its products.
- Support was announced for IDAPI connectivity as well as gateways to host data through the ODBC standard from Microsoft.
- The engine will be delivered as a Windows Dynamic Link Library (DLL) and will have integrated middleware components to allow access to SQL databases on other machines, without significant additional software installation chores.

We believe that the sale of Quattro Pro will benefit Borland principally by providing a timely cash infusion, which will assist in restructuring charges and other extraordinary expenses going forward.

The sale of this product line will also help allow Borland to focus on its core development-tool business. The Quattro Pro sale will allow Borland to coalesce around a single mission, rather than attempt to expand into a full-line supplier, competing directly with Microsoft on all fronts. As with most realignments in the software industry, the gating factor in making this work is successful execution.

Unfortunately, the sale of Quattro Pro and the resultant opportunity for heightened focus are not the major problems that Borland faces today.

We are concerned that the development-tool business, already agitated, will become even more competitive. This situation is due in part to departmental-level client/server tool vendors such as Powersoft Corporation repositioning their products down market to compete directly with cheap Microsoft products such as Visual Basic. This move, in particular, coupled with an aggressive response from Microsoft, will mean that margins for client/server tools will continue to drop.

For Microsoft, development tools represent an increasingly important way to control adoption of operating systems. With API wars now providing at least the potential for alternatives to most Microsoft-generated standards such as graphical interfaces, electronic mail, and so forth, development tools remain a key way for Microsoft to drive acceptance of its underlying operating system APIs. This suggests that even with a successfully executed sharpened focus, Borland will be dealing with a competitor that is increasingly aggressive in selling compilers to enforce its API standards.

We observe that Microsoft is not waiting for the $145 million check to clear the bank before it resumes competing with Borland. On March 15, Microsoft continued its "preemptive strike" anti-Borland strategy by announcing FoxPro 2.6, a maintenance release that abandons Microsoft's differentiated strategy for Xbase functionality in order to claim "99% dBase compatibility," in anticipation of co-opting Borland's claim of 100% compatibility for its forthcoming dBase for Windows product.

Lotus

Applications

We believe that the impact on Lotus in head-to-head standalone product categories will be slight. WordPerfect competes very favorably against AmiPro, which is unlikely to change in the wake of the merger. Most of Lotus's other products currently have, and will continue to enjoy, advantageous positions relative to WordPerfect offerings when considered as standalone products, without integration and without workgroup additions.

Groupware

In general, we do not see significant short-term threats to Lotus Notes because of the Novell–WordPerfect deal. However, Novell has gained several applications that compete in the workgroup space, including an e-mail package, the MHS message transport

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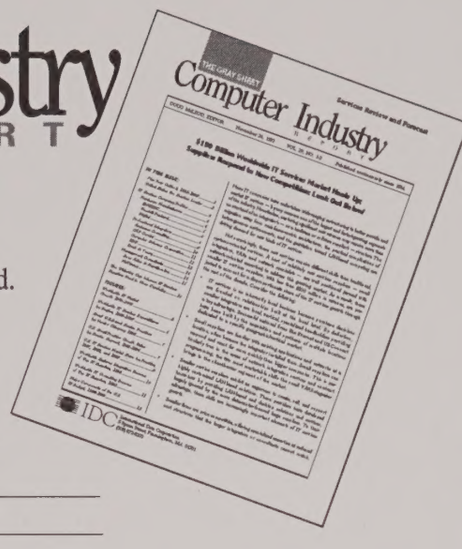

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protocol, and SoftSolutions' document management application.

The indirect acquisition of a document management product could lead to a much stronger presence over time in the object-based server environment. Clearly, with Microsoft's "Cairo" product on the drawing boards, it behooves Novell to have clear strategies for adding significant features to its server operating systems as soon as possible.

Microsoft

Impact on Standalone Products

We do not believe that the Novell–WordPerfect move will significantly affect Microsoft's short-term competitive posture versus WordPerfect and Quattro Pro. This is principally because Microsoft has just completed revising its word processor, spreadsheet, and presentation graphics packages.

Impact on Suite Business

If Novell–WordPerfect is able to offer an attractive suite bundle, it could carve out market share significantly in excess of its current single-digit level. While this would serve to reduce Microsoft's share percentage, it is impossible to predict whether such a revitalized WordPerfect suite would adversely affect Microsoft's unit shipment levels because of the high level of growth in the market.

However, Microsoft may find increasing competition for suite business going forward. Novell's existing relationships with corporate IS departments are looking to set corporatewide standards, which may lead to increased efficiency in volume purchase-agreement sales, an area in which Borland has traditionally lagged behind the other players.

Legal Wrangling

In general, we have refrained from speculation on the likelihood that the government will initiate or successfully prosecute action against Microsoft based on the numerous allegations of unfair competition that the government is currently reported to be investigating. However, we wish to observe that this merger could very well increase the probability that Novell will agitate for the strongest possible actions against Microsoft.

Over time, it appears that Novell has increasingly sought to broaden the battle front for legal action against Microsoft. Novell has led the charge to broaden the original inquiry from specific allegations before the Federal Trade Commission into a Justice Department-driven investigation. We believe that Novell was instrumental in bringing the European Community into the fray; the EC's Bureau of Competition has started its own inquiry into Microsoft's practices.

By widening the battle front from MS-DOS-compatible operating systems to include network servers and a suite of applications, Novell could conceivably bolster a potential antitrust suit for damages specifically suffered by it at the hands of Microsoft. Legal action attempting to show improper competition across such a wide range of products would likely be more credible than an allegation of impropriety in a dying market in which Novell held at best a single-digit market share.

Potential Revenue Stalls

We believe that it is possible for some customers to put off purchasing products from the combined companies while Hart-Scott-Rodino approval and other reviews are in process. Novell must move aggressively to avoid the risks of this occurring, particularly among large corporate customers.

Borland, also, must move to ensure that its customers don't postpone buying decisions as it braces for a new wave of adverse publicity. In particular, Microsoft has been marketing its Visual C++ product as "the safe choice" in compilers, attempting to make corporate stability an issue in tool selection, where it has not been typically important at low-end price points in the past.

Supergroup Formation Accelerates

In the 1960s, several rock groups such as Cream and Crosby, Stills, Nash, and Young were formed by well-established stars in earlier bands. Music critics were quick to call these new bands "supergroups."

The computer industry of the 1990s has seen foundations laid for numerous similarly evolved supergroups, typically involved in networking or multimedia standards. A defining characteristic of a supergroup as opposed to a standards committee is that each member typically makes a sizable equity investment (some might call this a "dowry") into the group's success. Examples include the General Magic alliance for personal messaging devices. We believe that the application programming interface (API) standards groups created to fight API wars against Microsoft or other market leaders may increasingly move toward supergroup status.

In particular, the Novell–WordPerfect merger may accelerate the trend toward supergroups. API standardization efforts in the past have generally floundered because of lack of commitment from individual vendors. As equity investments and product selloffs of the sort seen today increase, we believe that supergroups based on intertwined ownership will increasingly start to lead API wars, which will result in creation of more viable products than in the past.

Buyouts, and in the absence of buyouts supergroups, offer the best chance for delivery of successful standards. A key barrier to standards creation in the past has been the time required to obtain approval from a group of vendors, many of which may be competitors. Single competitors have the ability to respond to changes in the market much faster. But with a sizable amount of equity held hostage by a supergroup, vendors are likely to be inspired to move a little faster.

Because of the supergroup phenomenon, the merger of Novell and WordPerfect may improve the speed at which the OpenDoc consortium creates and implements the OpenDoc standards designed to compete with OLE 2.0.

Conclusions

The potential strategic advantage of Novell's purchase of WordPerfect will lie in its ability to do the following:

- Provide a common, scalable network transport required for distribution of enterprisewide applications as well as NOS services
- Leverage the communications portion of its office suite, something that both Microsoft and Lotus have downplayed
- Leverage desktop suite applications in the near term while developing competitive networked-based applications in the future

Major user issues such as integration of multiple e-mail directories, management and overhead of maintaining multiple e-mail systems, integration of desktop products with communication products, and maintenance and redundancy of network infrastructure services all have the potential of being solved in a unified Novell environment. If Novell can leverage both WordPerfect and its own application, services, network expertise, and strong user base, the potential for success is high.

The company must quickly address how it plans to integrate the current overlapping product sets, specifically MHS and the WordPerfect Office back-end services. With a strategy, the market will wait for delivery as it is doing now with Microsoft's MHS and Lotus's LCS.

The challenges Novell faces in providing these critical components are within its reach, but it has a short time window, somewhere within the next 18 months, to bring these integrated application and network solutions to the marketplace. In the meantime, Lotus will have sold a lot more Notes, and Microsoft will have brought to market its Touchdown clients and EMS server products that provide corporations with a strategic messaging and workgroup network application solutions set.

As corporations and businesses continue to migrate from legacy-based messaging and office systems to more client/server infrastructure, Novell must be ready to meet these users head-on with bundled network applications products and services that provide the right combination of pricing and functionality on the market. As the king of the infrastructure for networked applications, and with the addition of WordPerfect, Novell is in an enviable position.

— This article was written and researched by Brent Williams, Mary Conti Loffredo, and Ann Palermo.

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Latin America IT: Outgrowing Other Emerging Markets, Poised for Expansion Through the 1990s

Latin America is one of the fastest-growing major regions for information technology (IT) sales in the world. It represents one of the least penetrated IT markets worldwide. Of the major developing regions of the world, perhaps only the Asia/Pacific region has received more publicity recently. Latin America has benefited from economic stabilization, privatization, and pro-development legislation — NAFTA — which promises to further expand the region's overall wealth.

Opportunities in telecommunications, financial services, manufacturing, and mining, along with expanding small business and home sectors, are huge. Record privatization of Latin America's largest national corporations — from energy to airlines — is stimulating the regional boom. Information technology vendors are reaping some of the most lucrative rewards. In effect, Latin America is leap-frogging generations of missed technology and will end up with some of the most advanced systems in the world. Consider the following:

- IT spending in Latin America reached US$10.1 billion in 1993.
- By 1998, the regional IT market is expected to almost double to US$20 billion, growing from just under 3% to nearly 4% of worldwide demand.
- On a compound annual basis, between 1992 and 1997 the Latin American market is expected to outgrow all other major world regions, including the Asia/Pacific market, with expansion of 16%.
- Within Latin America, Colombia and Mexico are expected to grow at or slightly faster than the regional average.

Although growth has been rampant and IDC expects Latin America to continue to outgrow the overall worldwide market, this region has not been immune to the shake-out taking place in the IT world. Ironically, change may be even more evident as a result of two factors: (1) many vendors have only recently made a serious commitment to Latin America, and (2) distribution channels are still battling for market identity while being pushed by vendors to meet international expectations.

June 24, 1994 Vol. 29, No. 16

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Over the next few years, IDC expects one of the greatest regional changes to come with the rapid arrival and local investment of international distributors such as Merisel, Ingram, ProMark, TechData, Computer 200, and Future Tech, among others. These lords of low margins and high volume are making their power known in an unprecedented way. The presence of international distributors means that local channel partners must either join them or learn to compete more effectively against them. For multinational vendors, most of whom have long-established relationships with the large distributors, managing conflict between local channel partners and the arriving powerhouses of product distribution will be one of their greatest challenges.

Through the second half of the decade, IDC expects some of the largest regional expansion to be seen in the following markets:

- Personal computer shipments are projected to expand in Latin America at a CAGR in excess of 20%. The value of PC shipments will grow 16% over the same period, from $2 billion in 1992 to $4 billion in 1997.
- The Latin American LAN market, including network interface cards (NIC), network operating systems (NOS) and intelligent hubs, reached $173 million in 1992. By 1997, IDC estimates the market will pass the half-billion-dollar mark and total $522 million.
- Unit shipments of multiuser systems are expected to increase at a CAGR of 18% through 1997. IDC estimates that Unix system shipments will grow by 25% annually through the same period.

Overall, the robust growth in the region can be credited to a number of factors, including expanded offerings by international vendors, trade liberalization, and pent-up demand combined with the move toward downsizing and open systems. The years ahead will be exciting and profitable for vendors willing to invest in the markets and to develop long-term strategies adapted for the distinct characteristics of the region.

Latin Users: Leapfrogging to Leading Edge?

The Latin American IT market is growing rapidly, but not evenly. Which segments will see fastest growth? Where are the biggest opportunities for international IT suppliers and local distributors in Latin America?

These are just a few of the questions that IDC has addressed with the *1994 Latin American IT Survey*. The Latin American versions of IDC's worldwide *1994 Global IT Survey* has been designed to address the unique concerns and needs of users in this rapidly-developing market (see page 6). It tracks users plans in six areas: spending patterns, IT environment, PCs/workstations, LANs/WANs, software, and services.

Spending Patterns

Latin America continues to be one of the fastest-growing IT market regions in the world, with spending projected by IDC to increase nearly 16% per year over the next five years. Large sites in Latin America are investing across the board in new technologies. According to the users surveyed, spending increases will be especially strong in the areas of personal computers, servers, and packaged software.

- On average, users allocate 42% of their IT budget to internal spending (salary, facilities, and overhead), with 58% going toward external spending with some sort of outside vendor. This allocation percentage was very consistent across vertical markets in Latin America among the 600 users surveyed. Across countries, however, users in

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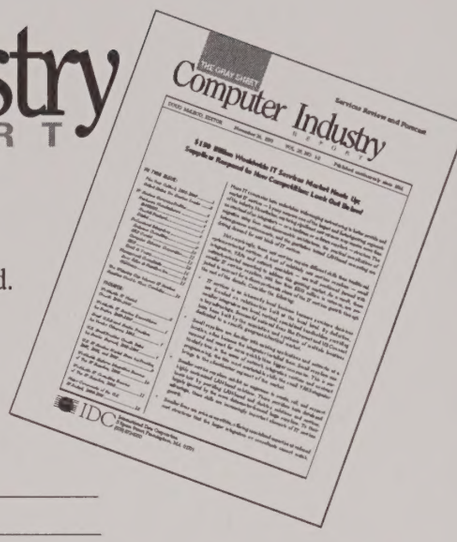

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Volume 29, Number 16

Argentina allocate on average over 60% of their IT budgets on salaries, facilities, and overhead.

- IT budgets continue to expand in Latin America. Of the 600 users surveyed, 54% plan to increase their overall IT spending in 1994 over 1993. In Mexico and Colombia, more than 60% of the surveyed respondents will be working with larger IT budgets in 1994.

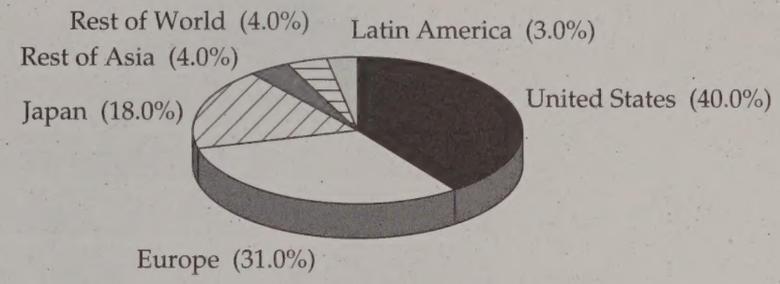
IT Environment

Investment in information technology continues to be a strategic focus of CIOs, IS managers and data center operations managers in large data sites in Latin America. Many large companies are faced with balancing increased competition from newly privatized organizations, more international vendors operating locally, and new demands from a growingly sophisticated customer base.

- The computer systems in use in large sites in Latin America are being utilized for a wide range of computer processing activities. However, general commercial processing (accounting, payroll, and customer sales and service record keeping) and office automation (word processing, spreadsheets, and document creation and management) were the most heavily used processing activities in the sites surveyed. Ninety-three percent of sites reported heavy general commercial processing activity, 80% reported heavy office automation, and 71% characterized their online transaction processing activity as heavy. Technical/scientific activity was reported to be heavy at 38% of sites.

- While the influence of computer system vendors on IT decision makers is strong across the region, Big Six accounting firms and management consulting firms are more influential in Venezuela and Brazil than in other Latin American countries. The impact of the business/trade press on decision making also varied in IDC's survey. Brazilian, Colombian, Venezuelan, and Mexican users, in that order, were among the most affected by the media.

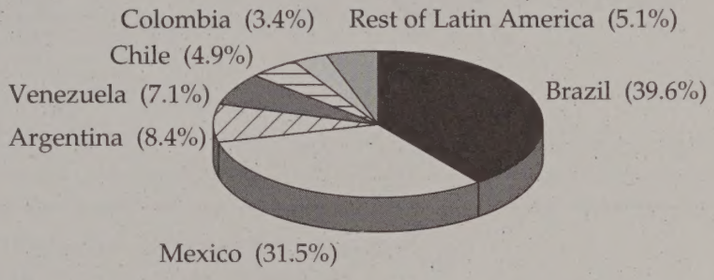
1993 Latin America IT Market in Context



Total = $380 Billion

Source: International Data Corporation, 1994

1993 Latin America IT Market by Country



Total = $10.1 Billion

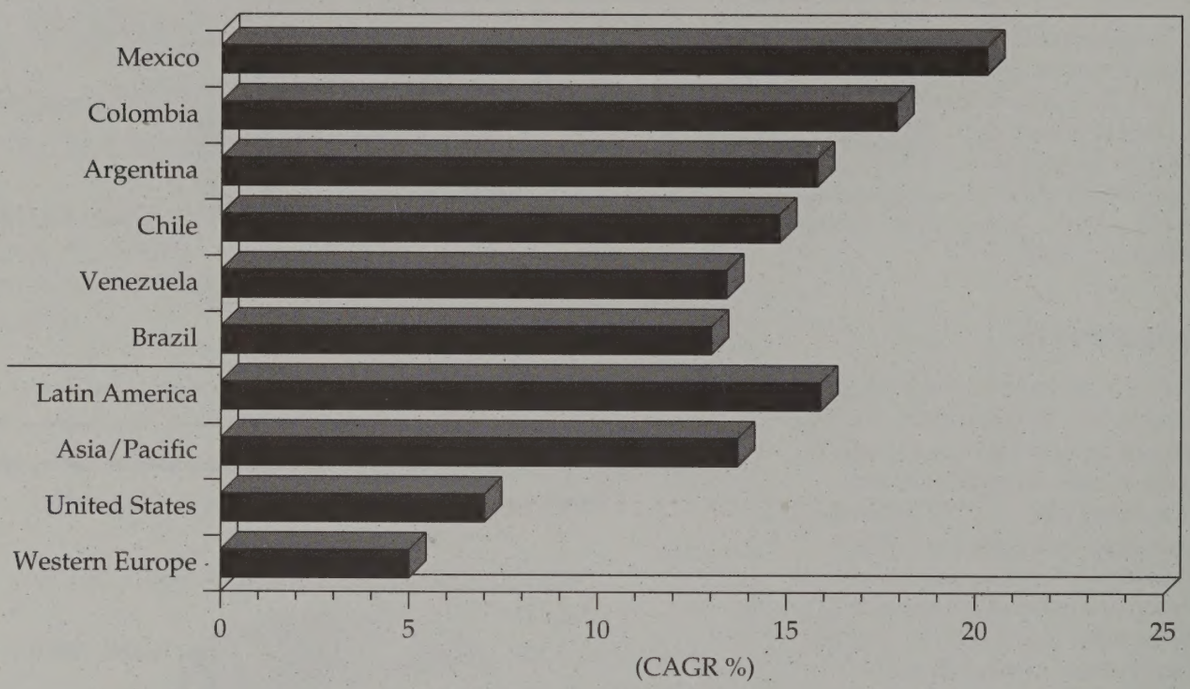
Source: International Data Corporation, 1994

PCs and Workstations

IBM-compatible personal computers continue to dominate the single-user market in Latin America, and the installed base of these PCs will continue to be the end-user device of choice according to the large users surveyed. Penetration of laptop PCs has yet to reach the proportions of the United States, Europe, or Asia, but this may be due to cultural bias or to the still undeveloped need for users to have a second PC in Latin America.

- Of the total personal computers purchased by the 600 sites surveyed in 1993, only 7% were laptop or notebook models. Argentina, Colombia, and Mexico recorded higher rates of portable use than in neighboring countries. IDC estimates that in the United States, laptop/notebook purchases by large users accounted for 14% of total PC purchases in 1993, and 16% in Europe.

IT Growth Rates in Latin America and World Regions, 1992–1997



Source: International Data Corporation, 1994

- A significant installed base of terminals remains in Latin America. In fact, nearly as many terminals have been installed in the 600 sites surveyed as personal computers. Relatively more terminals are present in the finance and manufacturing sectors, and fewer in the utility, petroleum, and telecommunication sectors.

LANs/WANs

Large user sites in Latin America with numerous personal computers are using local area networks (LANs) to share information and better manage document creation processes. At the same time, wide area networks (WANs) are becoming invaluable to large corporations in Latin America.

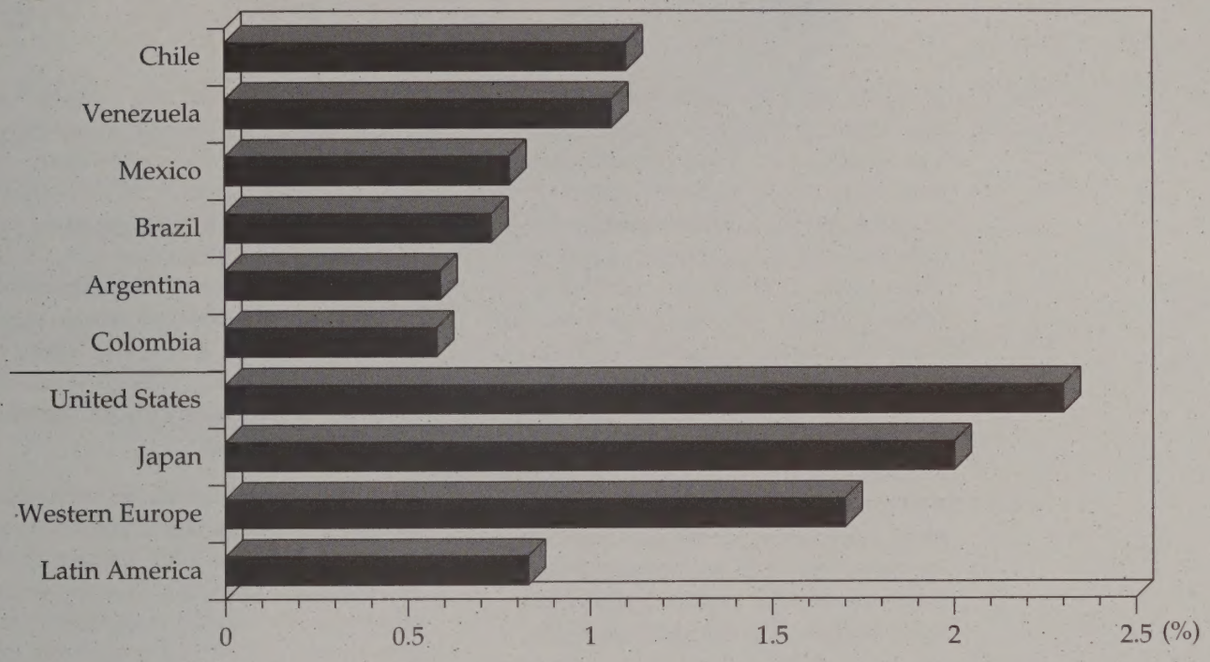
- Nearly 75% of the 600 sites surveyed in Latin America use a LAN. An average of 43% of the personal computers in these sites are connected to the LAN. Users expect this number to rise to 65% by the end of 1994. This number compares to an average of 64% of PCs in large user sites in the United States connected to a LAN, with 75% expected to become connected by the end of the year. The Latin American industries with the lowest LAN usage rates are manufacturing and wholesale/retail trade.
- The size of the local area network varies significantly by country. In Brazil, where large corporate users have only recently begun moving from mainframe environments to networked PC configurations, an average of 14% of the PCs in the sample were connected to a LAN. In Chile, this number was as high as 56%.

Software

Large user sites in Latin America have up until now preferred to develop software applications internally rather than purchase packaged software or contract out for custom software development. This may be explained in part by the region's cautious attitude toward contracting out or outsourcing important data center operations to external suppliers.

- Over 70% of the 600 sites surveyed prefer to develop primary software applications internally, while 13% use packaged software, and 17%

Latin America and World Region IT Spending as Proportion of Gross Domestic Product, 1993



Source: International Data Corporation, 1994

contract application development to a third party. In Brazil, 95% of the large user sites surveyed develop software internally.

- Although internal development is common, so is the use of state-of-the-art development tools. Nearly twice as many respondents noted that they develop software using state-of-the-art tools rather than programming in Basic, COBOL, or C.

Services

As the Latin America IT market develops, computer systems and software vendors are increasingly competing with the same vendors in Latin America that they compete with at home. With increased competition, the challenge to not only find appropriate channel partners but also to better service a more demanding end user will become even more apparent. Services are no longer an afterthought to providing product in these emerging markets, but a necessary component for successful vendors.

- Hardware maintenance was mentioned by the users surveyed as the service most often contracted out in every country across the region. On-site software support, training, and education, as well as help-desk services, were also mentioned as important services for which sites depend heavily on outside providers.
- From among a list of 13 major services, the sites rated business processing services and data center outsourcing as the least likely to be contracted to an outside service vendor over the coming year.

Latin America Distribution Channel Overview

Open market conditions combined with narrowing profit margins and lowering prices have left distribution channel partners groping for identity and precious territory in Latin America. Major international vendors are establishing new channels and modifying old relationships to increase market penetration and protect market share. These shifts in relationships are forcing traditional small dealers to adjust their skill sets and support capabilities to serve more demanding customers. Meanwhile, VARs are being pushed into providing more end-user services, and distributors are being forced to become more like high-volume box movers focused on tight margins and few or no services.

While similarities exist throughout the region, each of the six countries studied by IDC (Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela) are at varying stages of channel maturity and have differing characteristics. Mexican distribution is rapidly reflecting a North American model with a decidedly two-tier structure. This is reflected by many international manufacturers, which include Mexico in their U.S. and Canadian sales regions. Like Mexican channels, Chilean and Colombian channels are dominated by a top tier of players that steer the market. In Argentina, Brazil, and Venezuela, however, channels are less concentrated and numerous players vie for domination and leadership.

Despite blurred boundaries in the past between what appears to constitute a distributor, dealer, or VAR in terms of their relationships to end users, analysis of channel partners' revenues reflects a move toward international norms. Distributors are tending to represent low-end and a small percentage of networking products, with dealers and VARs handling higher-end products. In general, Latin America has relatively few PC VARs in operation.

Recent growth of the region's major channel partners has strong implications for the near-term outlook. Although robust expansion was reported by a large portion of the top 100 channel partners, the most common growth story was told by distributors. Many dealers had declining revenues, and many VARs grew by only a small amount. Channel concentration has been increasing dramatically with the largest players getting larger at the expense of smaller distribution organizations. Much of this trend is being fueled by acquisitions, especially in Mexico.

Although local subsidiaries have played a greater role in the regional strategies of many vendors, a large proportion of product purchased by the channels in Latin America is still sourced directly from international vendors, primarily in the United States, rather than local subsidiaries. These local products are growing rapidly and will significantly impact the local channels in the next few years, pushing them further into global competition.

Methodology for IDC's *1994 Latin America Customer Directions User Survey*

IDC interviewed 600 large user sites across Latin America with its *1994 IDC Latin America Customer Directions User Survey*. The survey was conducted in Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela.

- The 600 sites surveyed in Latin America had an average of 1,300 employees at the site, with 4,300 employees in the company as a whole.
- Of the 600 respondents, 35% were chief executive officers, 41% were IS managers, and 17% were data center operation managers. The remaining 7% were either network managers, business operation managers, or finance managers.
- In terms of the vertical markets sampled, 36% of the 600 sites were manufacturing concerns, and 20% were banks or insurance companies. Another 9% were in the utilities/telecommunications industries, 8% were in the wholesale/retail trade industries and another 8% were in the government or education sector. The remainder, grouped as other industries, included petroleum, transportation, and health care organizations.

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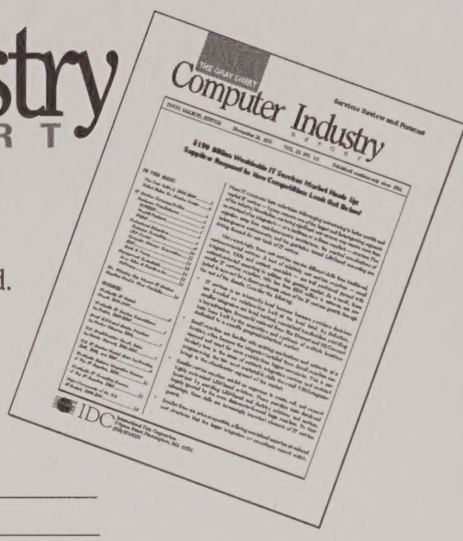

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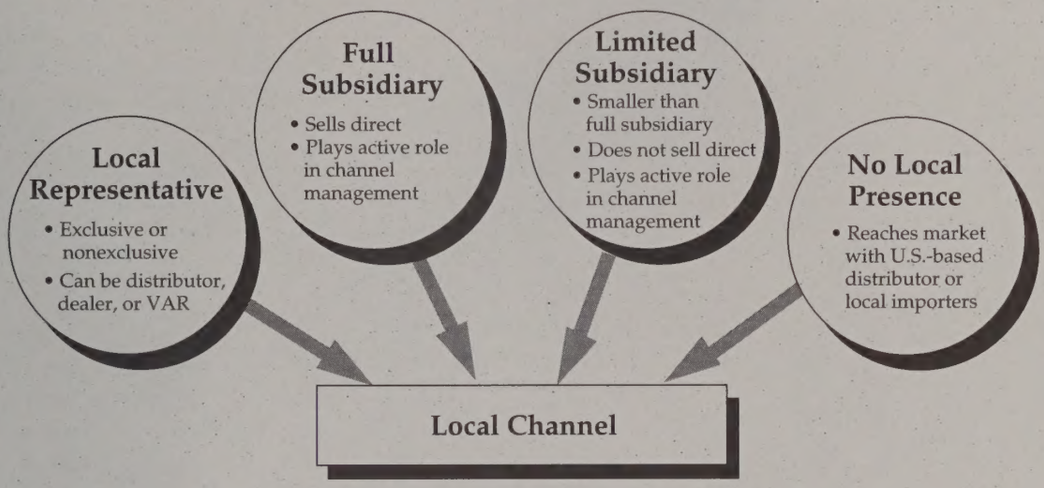
Volume 29, Number 16

Prominent Country Distribution Models


Local Representative
• Exclusive or nonexclusive
• Can be distributor, dealer, or VAR
Full Subsidiary
• Sells direct
• Plays active role in channel management
Limited Subsidiary
• Smaller than full subsidiary
• Does not sell direct
• Plays active role in channel management
No Local Presence
• Reaches market with U.S.-based distributor or local importers
Local Channel

Source: International Data Corporation, 1994

IDC's research in Latin America includes a full taxonomy of the channel structure of the top 50 product brands being sold across the six country markets studied (some 300 channel structures in all). Approximately 40% of the parent companies have a fully active local subsidiary. The same proportion have local country representatives.

An increasingly popular model in the region is to have a limited subsidiary in which a manufacturer has a local office supporting the channels, but does not sell directly to end users. This structure currently represents the situation for 15% of the top brands.

International suppliers are frequently in conflict with two diverse tendencies. Many feel the need to consolidate resources and strategies among a few select partners. They also share concern about the strength and long-term viability of many companies. As a result, suppliers are trying to justify expanded relationships with a more diversified base of distributors.

Trends: A Slow, Steady Maturation and Growth

Numerous factors are influencing the Latin America distribution channel development. Partners are being forced to modify their traditional business models based on local demand conditions, but also on the requirements placed on their organizations by international manufacturers.

In Latin America, the historical strength of major systems vendors has been legendary, as was their reluctance until recently to concede a major fulfillment role to channel partners. In recent years many of the top-selling U.S. brands have been able to attract the region's premier channel representatives, although increasingly many vendors are having to work hard to win the channels over. Companies with poorly focused regional organizations have in many cases made distribution deals in a haphazard fashion, and the rather limited channel specialization, which has been characteristic of most Latin American country markets, has restricted distribution partner choices.

Nearly all major international vendors have expanded their channels in recent years; nevertheless, some have chosen to control major accounts through a direct sales presence. With increased competition and reduced margins, direct sales strategies have resulted in significant channel conflict between manufacturers and partners.

The rapid arrival of U.S.-based distributors has been one of the most dramatic influences in the region. The arrival of Merisel, Ingram, Promark, TechData, and Future Tech, among others, is most notable in Mexico where joint ventures have been established with the nation's number-one (Ingram Dicom) and number-three (Merisel Mexico) distributors. However, U.S.-based distributors are getting established throughout the region through a variety of business models. Competition with local distributors will be intense as national enterprises are forced to compete with international firms often having greater access to capital and inventory.

The presence of computer superstores and retail centers selling IT products in Latin America is growing. These channels are primarily serving the small office/home office (SOHO) buyer and exhibit little threat to the dealer channel. One of the challenges in this channel is the need for manufacturers to provide training and support to retail sales personnel if the channel is to grow. Historically and culturally, there has been a void of training in the sector.

Mail order is being used by several dealers throughout the region, primarily through Miami-based dealers. This channel has had little impact on local dealers and distributors. While international mail order is expected to grow in the future, it may not achieve high volumes in Latin America because delivery systems are not yet developed, and mail order has no historical precedent in these markets.

When IDC asked channel partners to identify themselves as distributors, dealers, or VARs, a majority of the participants wanted to be perceived as VARs. However, very few companies are yet charging for services. Historically these providers were forced to offer many services on a complimentary basis along with systems purchases. However, decreasing margins are now forcing VARs to develop service businesses for profit.

Latin America is one of the fastest growing regions in the world for IT spending. With double-digit growth rates expected in Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela in the years ahead, international vendors must develop and nurture relationships with top channel partners to best penetrate these markets. IDC has observed that distributors, dealers, and VARs want to be treated as business partners rather than vendors of secondary importance. As the region is better recognized and investment in the channels continues, international manufacturers will be forced to be more competitive and assertive in developing and maintaining successful relationships with their channel partners.

For More Information. . .

Information in this issue has been excerpted from IDC Latin America's *1994 Latin America Customer Directions User Survey*. This is IDC's first study of information technology directions and spending patterns in Latin America. This study, patterned directly after the IDC *1994 Global IT Survey*, is based upon in-depth interviews collected from medium- and large-sized business in Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela.

The survey instrument was designed to extract the most useful and pertinent information on the current information technology climate, future IT strategies, and spending trends from information-system professionals in 100 large user sites in each country, 600 across the region.

More specifically, this research is designed to provide a comprehensive view of demand-side expectations regarding IT spending behavior, implementation plans, and acceptance of new technologies across all major IT sectors — PCs, LANs, mainframes, software, services, and internal staff activities.

For more information please contact IDC Latin America's Paul Pastrone at 415-962-6461.

THE GRAY SHEET
Computer Industry REPORT

Published continuously since 1964.

Buying the Future: A Review of Trends in Worldwide User Demand and Spending Patterns

IDC *1994 Global IT Survey:* Large and Medium Businesses and Top Executives

In the past year, a constantly changing business environment has challenged information technology users attempting to develop a coherent plan for IT investments. Erratic economic conditions, intensified global competition, and evolving management theories on technology use have all influenced user opinions on which IT solutions are best to pursue. At the same time, vendors are offering more technological options than ever before. Because customers are inundated with a wide array of options, an IT product developed for today's market is hardly guaranteed that demand will exist for it tomorrow.

July 22, 1994 Vol. 29, No. 17-18

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In order to shed light on the dynamics of end-user demand and spending priorities, IDC annually surveys the opinions of the top executives and information systems and LAN managers of companies across the world's major IT markets. Given the growing size and diversification of the market, IDC has chosen to broaden this industry-leading demand-side research effort this year by increasing its worldwide coverage and by gathering information on companies of all sizes:

- In-depth interviews were conducted with respondents from IS organizations at small, medium, and large businesses in the United States, Japan, Germany, France, the United Kingdom, Italy, Benelux, and Sweden. The survey instruments for all sizes of businesses were identical for about four-fifths of the questions.
- Separate instruments were developed for top executives (CEOs, CFOs, etc.) and for LAN administrators.
- Independent, typically smaller, versions of the survey are being separately administered in Canada, Latin America, and the Asia/Pacific region.

This issue of *The Gray Sheet* focuses in on some of the most interesting results from the surveys of large- and medium-sized businesses and organizations (sites with over 100 employees) and of top executives (CEOs, CFOs, and their equivalents).

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Who Will Buy? Survey Highlights

This year's study indicates that IT solutions have quickly transformed the way companies do business — over 85% of all top executives worldwide currently believe IT is definitely or to some extent a part of their core business strategy. Given this lofty status and the significant financial commitment companies must make to their IT infrastructure, investment strategies must incorporate a broad range of elastic market factors and technology alternatives. IDC's *1994 Global IT Survey* monitors the impact that changing market conditions have on user priorities and the individuals who have the greatest influence on altering IT investment decisions.

Among the most interesting findings of this year's user survey are the following:

- The main focus of worldwide IT spending has shifted over the past year toward its impact on the organization's competitiveness, except in Japan, Italy, and France, where sluggish gains in company revenue have raised executives' interest in the long-term cost-cutting implications of IT investment.
- Of the surveyed top executives, those in the United States remain the most optimistic about increasing their IT expenditures. However, spending plans have generally moderated from a year ago. The United Kingdom is the lone country where the percentage of CEOs and CFOs expecting to raise their IT investment levels has increased over the last year.
- Enthusiasm for primary vendors, whether IBM, Digital, Fujitsu, Hitachi, Bull, SNI, or their competitors, is waning worldwide, except in the United Kingdom, where 63% of top executives are either satisfied or very satisfied with their primary vendor — an improvement over a year ago and nearly ten percentage points higher than the next most satisfied customers in Germany.
- Less than half of IBM's customers worldwide believe the company has the ability to catch up to changes in the computer industry. The highest degree of doubt exists in the minds of U.S. executives.
- Globally, IS managers' attitudes toward client/server computing remain unchanged from a year ago — only one-quarter of the respondents are moving or have moved to this architecture. Regionally, interest is rising in Japan while the strong growth in Western Europe is apparently starting to level off.

Spending Trends

IT Investment Focus

The long-awaited European economic recovery finally began to take root during the survey period, and business conditions in Japan started to stabilize after a turbulent year. The economies of all of the world's major regions are now expanding, and *Consensus Forecasts* reports that its panel of economists expects the global economy in 1994 to nearly double last year's growth rate of 1.3%.

Nevertheless, the past few years of debilitating economic doldrums have shifted executives' IT focus toward competitiveness issues. This sentiment is particularly strong in Sweden and the United States, where it is the primary focus of 60% and 50% of survey respondents, respectively. In con-

trast, only one-third of the executives of the Benelux region consider competitiveness gains the strongest impetus for IT investments.

Similar to last year's findings, improving competitiveness and integrating central and end-user resources into a single enterprise information system remain the top two objectives of IT investors worldwide. However, compared to a year ago, only the competitiveness and cost-controlling issues have notably strengthened. The migration to more modern platforms has become less important, as most users have decided to become comfortable with the technology level of their currently installed systems. Whereas in 1993 over a quarter of German executives surveyed stated their main area of IT focus was upgrade requirements, none gave the same response in 1994.

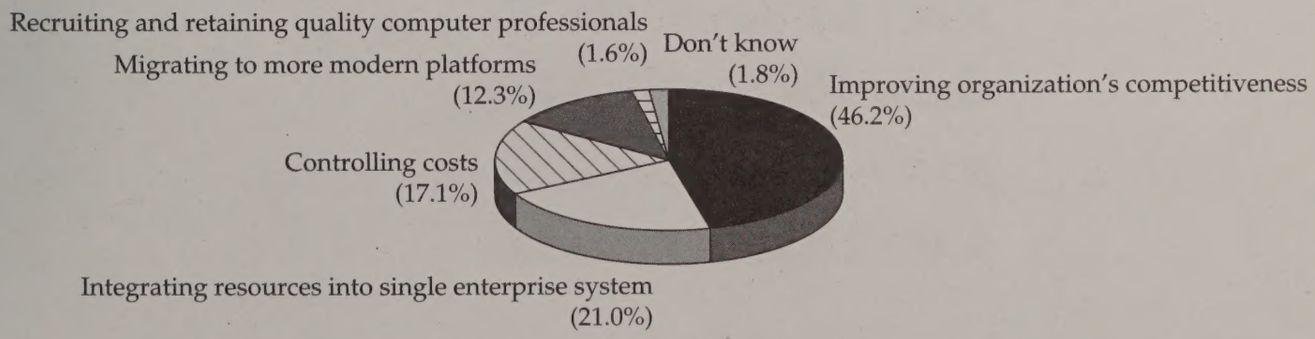
Although competitiveness gains are the primary focus for IT markets across all countries surveyed, in regions where sluggish economic conditions were particularly enervating while the survey was being administered in the first quarter of 1994, this issue was overshadowed by interest in cutting IT costs, particularly in Japan, France, and Italy. But the overall global trend suggests competitiveness gains will be the key selling point for IT vendors as the economies across all regions gain momentum. The growing prevalence of management strategies emphasizing the enabling aspects of information technology, as opposed to its cost-saving and automating features, will also support the growing interest in the potential impact IT has on competitiveness.

Spending Directions

The reorganization of companies during the recent global economic downturn turned the attention of CEOs and CIOs toward boosting productivity while reducing costs. Nevertheless, their projections for 1993 indicated that they were now more willing to invest in information technology, as 40% of all top executives planned to increase their IT budgets and only 18% expected to reduce their spending levels. In fact, more executives expected to raise their 1993 IT expenditures than lower them in every country surveyed, except the United Kingdom.

It didn't turn out as the CEOs anticipated; the CIOs took the fall. Almost one-third of all respondents expect to increase spending in 1994, down from last year's 40%, and one-quarter anticipate declining IT investments, up from 18% a year ago. The outlook for IT budgets has cooled slightly in all countries, except the United

Top Executives' Most Important Area of Global Focus, 1994
(Percent of Worldwide Respondents)


Recruiting and retaining quality computer professionals (1.6%)
Don't know (1.8%)
Migrating to more modern platforms (12.3%)
Improving organization's competitiveness (46.2%)
Controlling costs (17.1%)
Integrating resources into single enterprise system (21.0%)

N = 698

Note: In response to the question, "Which of the following five tasks will be your organization's main area of focus for information technology during the next 12 months?" close to half of all top executives surveyed noted improving their organization's competitiveness. Compared to last year, upgrading platforms is less of an issue, while competitiveness and controlling costs have become greater concerns.

Source: IDC's 1994 Global IT Survey

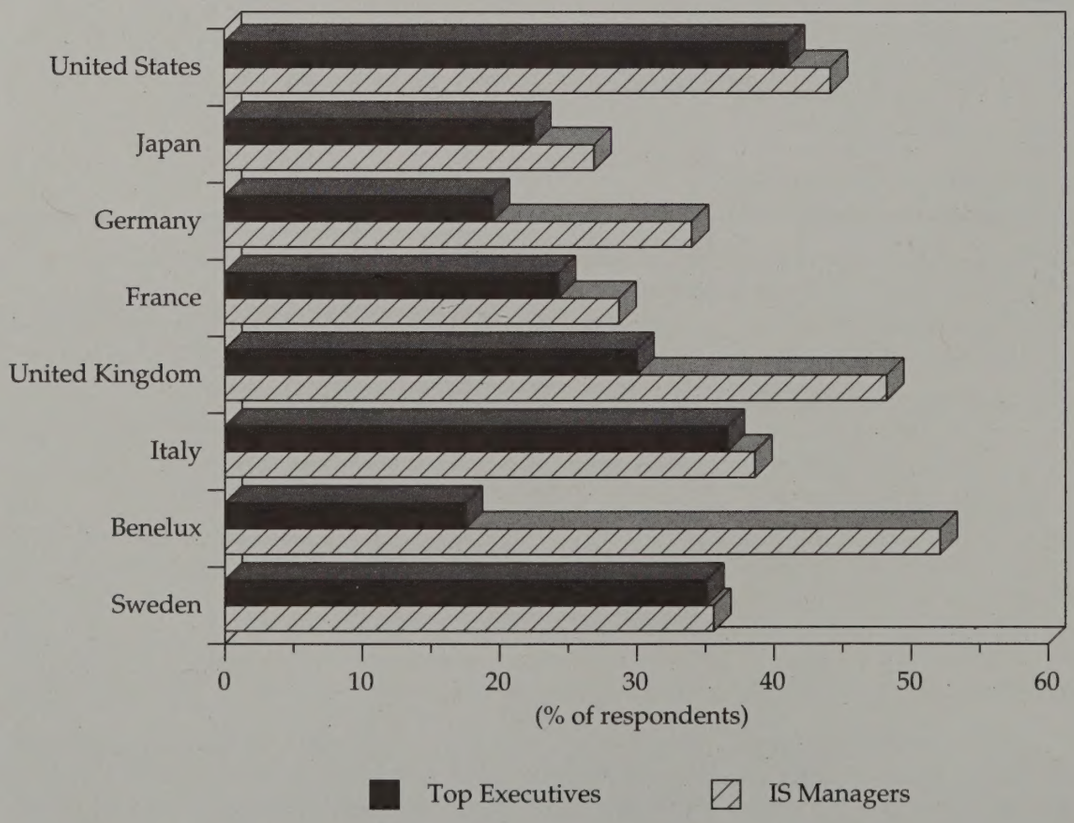
Kingdom, where improving economic conditions are loosening purse strings. Almost a third of British execs surveyed are now optimistic that their investment levels will rise. In general, most top executives expect their 1994 IT spending to remain at the same level as in 1993.

According to this year's study, the most promising growth markets are in the United States, Sweden, the United Kingdom, and Italy (where only 8% expect to decrease expenditures). In each of these countries, those executives planning to increase IT expenditures outnumber those planning to decrease spending. IT investment plans remain the most aggressive in the United States, where 41% of executives surveyed expect IT spending to rise and 40% anticipate no change from last year's inflated budgets. However, plans to increase spending have been tempered compared to a year ago when over one-half of those surveyed anticipated higher IT budgets.

Executives in Japan, Germany, France, and Benelux have the most restrained outlook for this year, as plans to reduce IT spending overtake those that will increase expenditures. The most pessimistic scenario exists in Japan, where financial difficulties still remain. Only 22% of the respondents expect to increase their IT budgets, while over 40% anticipate investments to fall even further from their moderate 1993 levels.

Information systems managers of large and medium businesses were also asked their opinion on the direction and amplitude of IT spending in 1994. Judging by the results, the battle over the IT budget will be most fierce in Western Europe. Not surprisingly, in most countries IS

Anticipated Increase in 1994 IT Spending,
Top Executives vis-a-vis IS Managers at Large/Medium Businesses
(% of Respondents Anticipating IT Spending to Increase)



N = 697 Top Executives, 5,906 IS Managers

Source: IDC's 1994 Global IT Survey

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managers were more optimistic about IT expenditures in 1994, expecting investment levels to climb an average of 3.6%. In contrast, CEOs worldwide generally plan to keep IS budgets constant with 1993 levels.

The discrepancy between IS managers and CEOs is amplified in Germany and the Benelux nations. In Benelux, only 18% of top executives surveyed anticipate rising budgets, but 52% of IS managers count on increasing expenditures. A similar split exists in Germany, where IS managers expect to increase their IT expenditures 5.4%, yet German CEOs anticipate a 9% decline. Vendors beware.

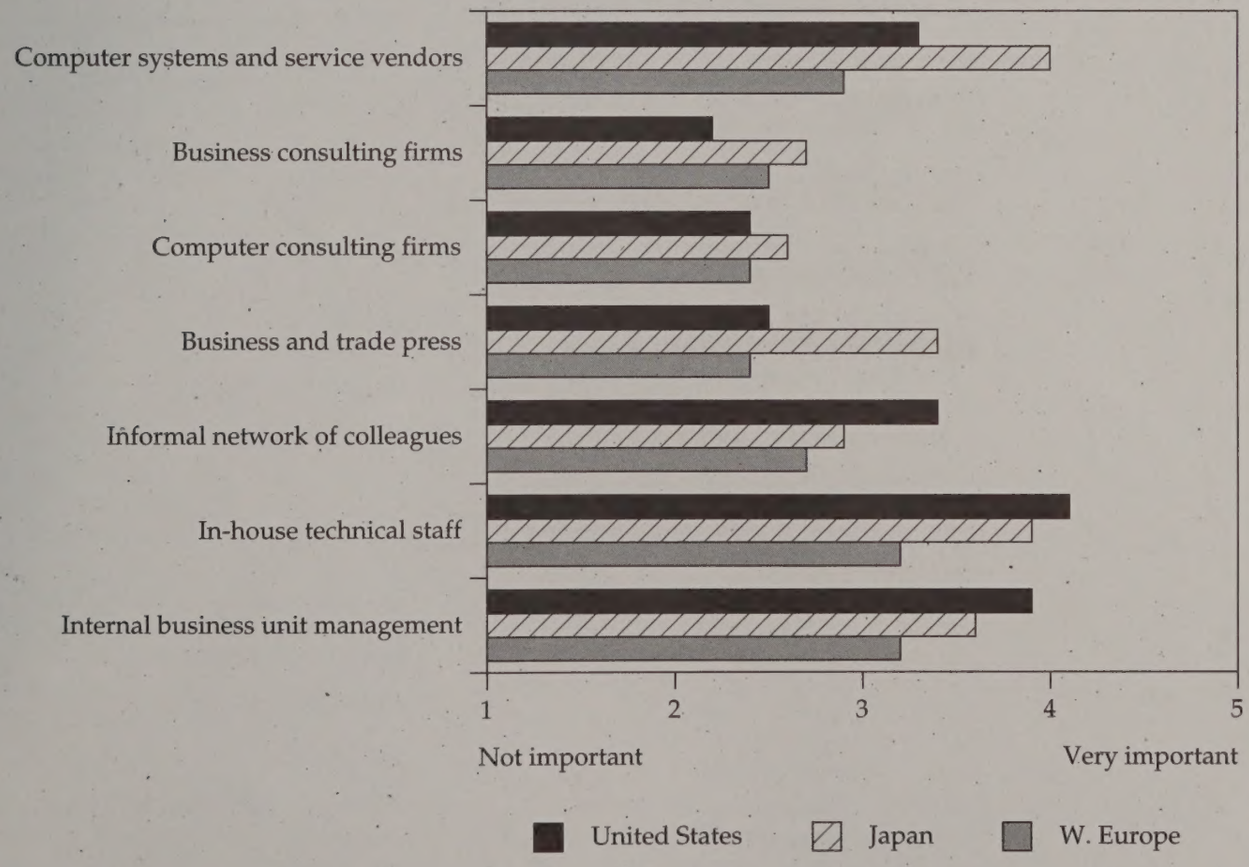
Influence on Spending Decisions

Although IS managers may be more willing to purchase IT equipment, top executives still hold tight control over spending levels. Who influences their budget decisions?

Fortunately, the survey indicates that top executives in all countries consider their in-house technical staff to be the most influential group on IT decision making in their organization, with the exception of Japan, where computer systems and service vendors have the greatest influence, and Germany, where business consulting firms are given the highest marks. Internal business unit managers are ranked second across all countries.

Over half of U.S. and Italian executives, and more than 45% of Japanese and U.K. executives surveyed believe the role of MIS in their organization is strong and growing. However, the anticipated reliance on MIS staffs in Japan has cooled from a year ago, when nearly 70% of executives believed the role of MIS

Influencers on Top Executive IT Decision Making, 1994



N = 599

Note: Based on a scale of 1 to 5, 1 = not important and 5 = very important

Source: IDC's 1994 Global IT Survey

would expand. Also, in Germany, where almost all businesses surveyed include a centralized MIS group, only one-quarter of the respondents believe the influence of the in-house technical staff will increase. Instead, MIS staffs will remain just one of the major influencers of IT decision-making in Germany.

Since the role of the MIS group is generally stable and growing in most countries, vendors should focus on the factors that influence information system managers. This year's survey of large and medium business IS managers reveals that the in-house technical staff holds the highest level of influence on IT decision making in the United States and Western Europe. An informal network of colleagues and direct contact with computer system vendors ranks second and third in these two regions.

In contrast, Japanese IS managers note that their in-house staff and computer system vendors equally have a strong influence on their purchasing decisions, while the business and trade press ranks third. Value-added resellers are also becoming a significant source that assists IT purchasing decisions.

Primary Vendors

IBM dominates the world IT market and the attention of CEOs and other top execs in this year's survey. The majority of top executives considers IBM to be its primary IT supplier in the United States, the United Kingdom, and Italy. The lowest level at which IBM is perceived as a primary vendor is in Germany, where the company still captured one-quarter of the responses. Of all the executives surveyed in this year's study, 43% considered IBM to be their primary vendor. Fujitsu was next in line at 6%, and Digital followed with 5% of the market.

Judging by the opinion of top executives, the best opportunity for vendors to gain market share remains in Japan, where vendors who have thrived by their customers' high level of dependence on them, can become convenient scapegoats when things go wrong. Only 14% of the Japanese chief execs surveyed are either satisfied or very satisfied with their current primary vendors — an even lower percentage than last year's already low confidence rate of 19%. At the other end of the spectrum, 63% of executives in the United Kingdom, where economic optimism is catching, are satisfied or very satisfied with their primary vendors.

In between, the trend tends toward moderate dissatisfaction with customers' primary vendors. A year ago, 11% of U.S. and 15% of German executives answered the maximum response of being very satisfied with their primary IT supplier. In 1994 these responses dropped to 3% and 9%, respectively. In a competitive market, where customer satisfaction is increasingly becoming a differentiating factor in the choice of vendors, even a small slip in satisfaction ratings should be a concern to IT vendors.

Technology Trends

Each year IDC asks survey respondents to describe their expected use of various new products and technologies over the coming 12 months. The product set in the 1994 survey, sorted by the heaviest expected use on a transnational, budget-weighted basis, was:

- Client/server application development tools
- CD/ROM
- Electronic data interchange (EDI)
- Microsoft Windows NT
- Groupware products
- Image processing
- Color printers
- ISDN
- The Internet
- PC-fax boards
- LAN-based fax servers
- Multimedia applications
- Intel Pentium-based PCs
- Fault-tolerant hardware/software systems
- Object-oriented programming
- Computer-aided software engineering (CASE)

- Disk arrays (RAID)
- X-Windows terminals
- Asynchronous transfer mode (ATM)
- IBM OS/2
- Pen-based computers
- Personal digital assistants (PDAs)

This order would have been broadly similar in earlier years (EDI has consistently ranked very high, pen-based computers have consistently nestled at the bottom), but some of the changes are significant. For example, on the U.S. checkerboard, both multimedia applications and disk arrays have jumped over several other pieces since last year, while CASE usage has slipped.

The survey also spotlights exceptional trends within countries. For example, ISDN ranks right up at the top in Japan, Germany, France, and the United Kingdom; its overall number eight position is due primarily to its relatively weak acceptance in the United States, which is more on a par with Italy and the Benelux countries. EDI and fault-tolerant systems lag in Japanese respondents' plans compared to other countries in the survey base, while groupware doesn't generate the same level of excitement in Europe, particularly on the continent, that it does in Japan and (particularly) the United States.

One of the most interesting results of the survey, though, is the sharp variation by country in respondents' general level of acceptance of new technologies. The New Technology Acceptance Index portrayed here is derived from the average responses for the 22 products and technologies on a scale of 1 to 5, with 5 representing heavy use in 1994. The results support the image of the Swedes as enthusiastic early adopters of new technology, while the phlegmatic Dutch and Belgians need a little extra nudge before they move beyond the tried and true.

The most surprising result, though, is the position of the Japanese atop the New Technology Acceptance Index. In previous years' surveys, respondents in Japan had been much more chary when confronted with nontraditional products and technologies. The sharp turnaround signals a sea change in Japanese users' attitudes toward the new.

The revolution in attitudes is also on display on related questions dealing with products and technologies. For example:

- The proportion of sites in Japan that state that they are pursuing a Unix-oriented strategy still significantly trails Western Europe, but has almost caught up with the United States.
- If they are going the Unix route, Japanese sites are more willing to consider NT as an alternative to Unix than their peers in the United States or Western Europe.

IDC's *1994 Global IT Survey*

The *1994 Global IT Survey* is IDC's annual worldwide study of information technology directions and spending patterns. It is the largest survey project of its kind, consisting of nearly 15,000 in-depth interviews from small, medium, and large businesses in the United States, Japan, and Western Europe. The survey depicts current IT usage and plans in a customer base representing over three-quarters of the worldwide market.

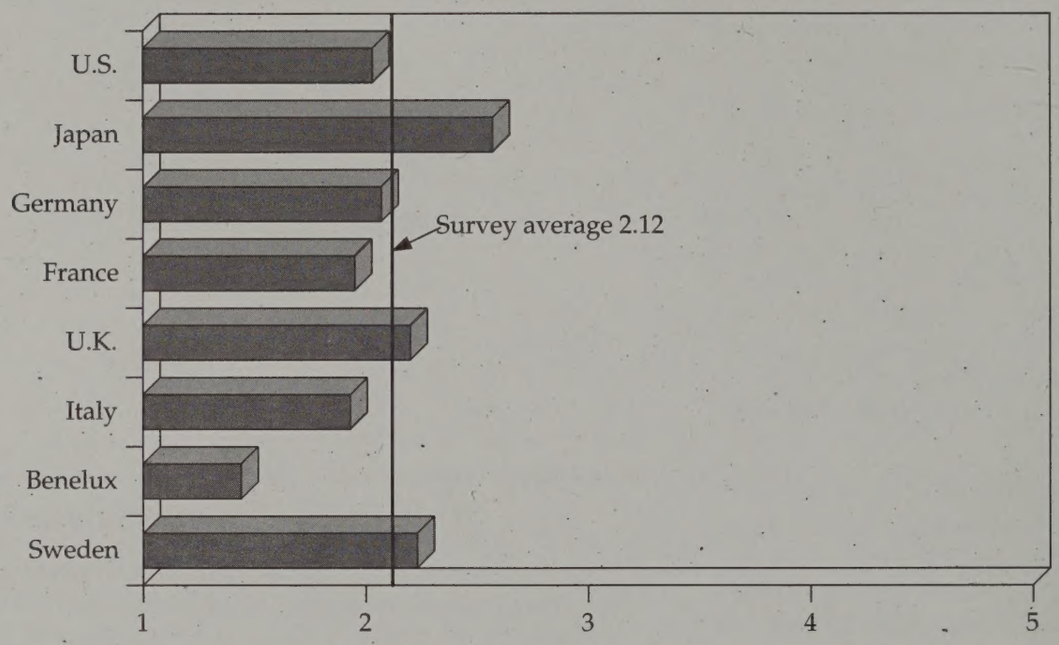
Four separate survey instruments were specially designed to extract the most useful and pertinent information on the current information technology climate, future IT strategies, and spending trends from three levels of management: top executives, information systems professionals, and LAN computing managers.

The primary objectives for the *1994 Global IT Survey* are:

- To better understand the 1994 customer environment in terms of its current priorities, overall attitudes toward IS change, and influences on IT decision making.
- To identify implementation strategies in such critical areas as business process reengineering (BPR), client/server, open systems, Unix, outsourcing, and local area networks (LANs).
- To establish current and future usage patterns for key products such as personal computers (PCs), workstations, LANs, operating systems, software, and emerging technologies like personal digital assistants (PDAs), Windows NT, electronic data interchange (EDI), and CD-ROM.
- To estimate actual 1993 and anticipated 1994 spending levels and to determine allocation of this spending across internal and external resources.

In short, the project is designed to present a comprehensive global view of IT plans, attitudes, and concerns. For further information, please contact Linda Rich at (508) 935–4389.

New Technology Acceptance Index, 1994:
Large and Medium Businesses in the United Kingdom, Japan, Germany, France, Italy, the Benelux Countries, and Sweden



N = Average of 5,514 sites, high 5,682 (color printer usage), low 5,209 (ATM usage)

Source: IDC's 1994 Global IT Survey

Attitudes are not purchase orders. Respondents, after all, were asked how they would portray their use of new products, which may not correspond to vendors' characterization of their acceptance of new products in comparison with other national markets. Nevertheless, the results for Japan in the IDC *1994 Global IT Survey* should be studied carefully.

Our preliminary interpretation of the results on Japan would point to the psychological effects of the debilitating recession, perhaps exacerbated by political turmoil and confusion. Japanese IT users could comfortably isolate themselves within a cocoon spun by a limited number of local vendors following the lead of IBM technology so long as the economy bubbled along. But since the bubble burst, more and more IT users in Japan apparently have been rethinking their priorities, and deciding that to regain momentum they must invest in best-of-breed technology, no matter its provenance, no matter its revolutionary implications for the traditional ways of doing things in Japan.

This mindset may prove ephemeral and evaporate when the economy finally regains its footing, although even in this case vendors should take advantage of the new attitude while it lasts. Much will depend on pragmatic tests: If the new technologies with which Japanese users experiment during this exceptional period generate new efficiencies, they may spell the end of Japanese exceptionalism in IT usage. Ironically, although U.S. vendors and technology would be the initial beneficiaries of a revolution of this scope, the long-term winners might well be the Japanese manufacturers that are currently handicapped in international competition by their inability to try out innovative technology with a sophisticated community of users at home.

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Digital Reorganizes Again, but This Time Gets Most of It Right

Ever since the departure of founder Ken Olsen, Digital Equipment Corporation has been struggling to find a new identity in a changed world. The first attempt in December of 1992 tried to position Digital as a services company organized by specific industry sector. As IDC predicted, this effort was not aligned with Digital's true competencies. It was thus a dismal failure and precipitated a rough start for new CEO Bob Palmer (see *The Gray Sheet*, March 21, 1993, Volume 28, Number 9).

Now, some 18 months later, a new more product-oriented approach has been announced. Although there are still some questions, the new structure is far more logical. It is very much in line with IDC's view that all of the traditional systems companies need to evolve toward largely independent business units focused on particular parts of the industry value chain. The key aspects of the new organization are as follows:

- **A direct sales and systems integration division.** To improve customer service and increase efficiency, Digital has created a new Accounts Business Unit (ABU), a profit and loss operation responsible for selling all Digital products and services to the company's 1,000 largest accounts.

  The company has decided to move from 8,000 direct accounts to 1,000. This will be a major means of reducing its costs and improving service to its biggest accounts. However, managing this transition from both a customer and revenue perspective will be one of Digital's toughest challenges.The ABU will apparently supersede other business unit structures, meaning that both the Multivendor Customer Services unit and Digital Consulting will provide services to the major accounts through the ABU. This could presage eventual repositioning or downsizing of these currently large units.

  Although Digital intends for the ABU to eventually have a focus on specific industries, no details have been announced at this time.

- **Autonomous product divisions.** Each major product area — Intel systems, Alpha systems, networks, storage, etc. — will sell its products either through the ABU or indirectly through channels. To increase volume, Digital wants to reestablish its indirect channel presence in virtually all product areas. In a major change, each product group will finally have its own manufacturing and engineering. Indeed, the breakup of Digital's long-standing central engineering and manufacturing functions is the main reason Digital executives are saying that matrix management is dead. Like the ABU, the major product groups are separate profit and loss centers.

- **Alpha/Intel shift.** Digital is now clearly a two-platform company. Intel-based products will no longer be positioned as just PCs. What Digital now calls its PC and Systems Business units are in reality an Intel systems unit and an Alpha systems unit both competing for outside channels and the attention of the ABU. This represents an increased commitment to Intel and a step back from a 100% focus on Alpha as the company's core server platform. To avoid unnecessary internal friction, systems based on both platforms now report into a single executive, Enrico Pesatori, who also runs the ABU.

- **Alpha hedge.** The decision to keep the Alpha semiconductor and Alpha systems businesses separate, coupled with the increasing role of Intel platforms, indicates that Digital is hedging its bets on Alpha. In addition, the separate Alpha semiconductor unit is perhaps the last major vestige of the matrix management structure. However, keeping Alpha

separate makes it easier for Digital to either find needed semiconductor partners or sell outright the Alpha manufacturing facilities. Action in at least one of these two areas is likely.

- **Operating system neutrality.** Digital is still a three-operating-system company — OpenVMS, DEC OSF1, and NT. Unix will continue to be heavily emphasized; OpenVMS will be treated better than it has in the last few years, and NT will be positioned as an important longer-term play. Beyond operating systems, the company's software strategy is still undetermined, although action in this area is expected within the next few months. Software is the company's single largest unresolved area.

- **New global structures.** Digital's country and regional structures are also changing radically. International resources will be allocated either to the ABU or to the product business units. The formerly powerful country subsidiary role is being reduced to "hosting," acting largely as landlords covering logistics and other administrative tasks. This structure should facilitate head-count reductions internationally, always a difficult issue, especially in Europe.

- **Changing executive responsibilities.** Enrico Pesatori has moved to center stage, emerging with all computer systems as well as the worldwide ABU. Charles Christ, having done a good job with the storage unit, has been given networks and what's left of the storage business after the Quantum sale, as well as other components and peripherals. Bill Strecker, chief technical officer and former head of all engineering is now focused on advanced technology in emerging areas. All three continue to report to CEO Bob Palmer, who also oversees the Alpha semiconductor operations, as well as Multivendor Customer Services and Digital Consulting.

The ascendancy of Messrs. Pesatori and Christ along with Gresham Brebach (consulting), Harry Copperman (the Americas), and Vincenzo Damiani (Europe) completes the near total transition toward executives brought in from the outside.

What Does It All Mean?

The good news is that Digital has entered the real world. Its PC business is modeled after Compaq; its systems business is more like Sun's, and if the services group isn't really like EDS or Unisys, it is closer than it was before. We would have preferred an organization that had separate executives in charge of product and service activity. Perhaps this adjustment will come through ongoing fine-tuning. Nevertheless, we would expect the logic behind the new structure to remain largely intact for the foreseeable future. This alone has to help employee morale, particularly once the big layoffs are over.

The bad news is that the rest of the world has been operating along these lines for a decade and thus Digital has a tremendous amount of catching up to do. Although necessary, trying to be more like the market leaders is clearly more of a "me too" as opposed to a leapfrog strategy. Digital is also just beginning the implementation phase, which promises to be difficult in at least two areas: the handing over of some 7,000 accounts to channel partners and the restructuring of all of its country and regional operations. All of this will take time. Digital hopes to have most of the changes in place by January 1.

Organization charts aside, Digital is still a player in many businesses and a leader in few. Consequently, the company lacks a clear identity in the market. The current emphasis on being the leader in "open client/server computing" is still a little too vague and competes with numerous similar claims. Over time, as the independent business units succeed, fail, or are sold, a more focused company and a new image should emerge.

The rise of Mr. Pesatori with his previous background at Olivetti, Zenith, and Digital's PC unit is a clear indication that Digital no longer intends to bet the company on Alpha. It is also symbolic of the company's desire to be more volume-oriented, channel-driven, and PC-centric than in recent years. Managing the Intel and

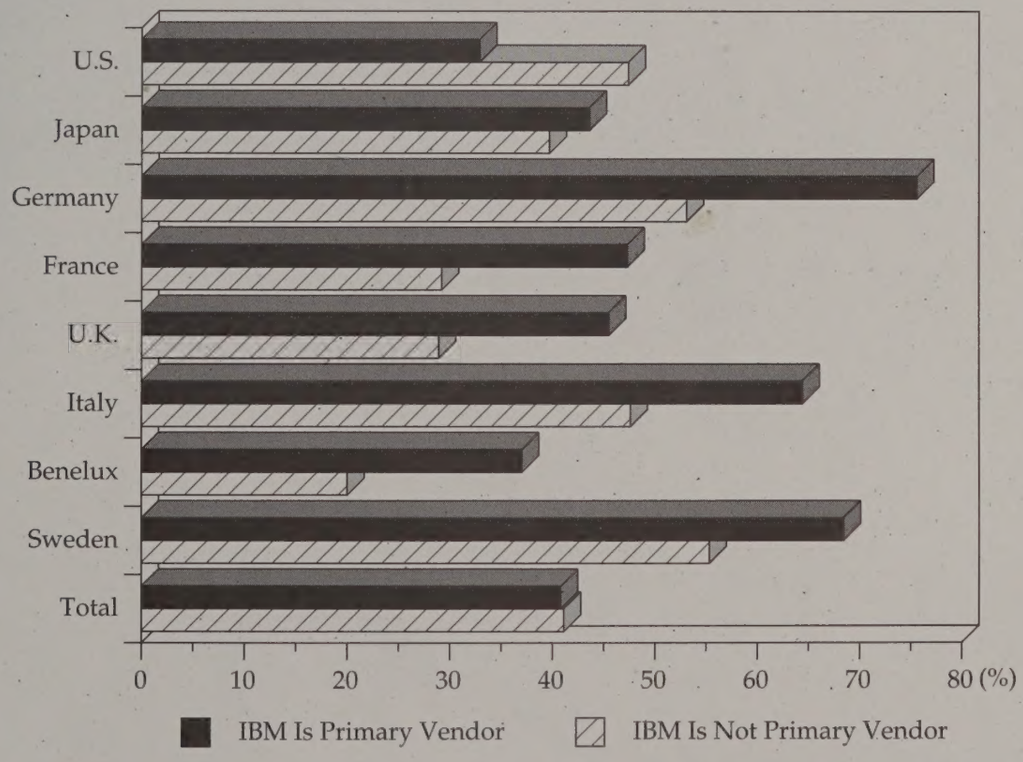
Alpha systems as well as the large, global ABU division presents Mr. Pesatori with a very full plate indeed. He controls the traditional core of the company.

In sum, the new approach is an essential step that allows Digital to see its costs and opportunities more clearly and thus make better business decisions. However, seeing reality more clearly doesn't mean that one will necessarily like what one sees. The challenges are immense on many fronts. Now that the basics are coming into place, the task for the next year is trying to make up for precious lost time.

Is it too late? In today's highly competitive and unforgiving IT industry, the consequences of making these changes now as opposed to five years ago are certainly serious. Having waited this long, the Digital that is emerging will likely be a smaller, less diverse organization than it was at one time capable of becoming. But the company still has its large installed base of customers and significant competencies in a wide range of areas, and therefore it is still very much alive. Perhaps the best thing about the new organization is that it appears to give each part of Digital a clear chance to prove itself, because the company finally appears to be headed on the right structural course.

Opinions on the Future of IBM

(Percent of Executives That Believe IBM Will Catch Up to Changes in the Computer Industry)



N = 381 (primary vendor) and 317 (not primary vendor)

Note: Only 41% of all executives surveyed worldwide believe IBM will be able to keep pace with changes in the computer market, while 45% are still unsure of their fate. Outside the United States, IBM's customers are more confident in the company's ability to return to the leading edge of the industry. But the large base of customers in the United States are less optimistic than noncustomers.

Source: IDC's 1994 Global IT Survey

Expectations for IBM

IBM's PR machine has done well by its new team of top executives, but doubts persist for the respondents in this year's *Global IT Survey*.

IBM is managing account control fairly well. Despite this year's addition of Benelux and Sweden (which pulled down the global average), 43% of all top executives surveyed in 1994 considered IBM to be their primary vendor, about the same as in last year's survey (which had a slightly different pool from which to draw names and a different stratification for the survey sample).

Yet when asked about IBM's ability to catch up to the pace of changes in the computer industry, only two out of every five top execs were even willing to agree that IBM will "probably" regain something like its historic position. Fortunately for IBM, only 4% of the top executives felt that it was "unlikely" that Big Blue would catch up. For half of the respondents, the jury is very much out. Either they agreed that it was "unclear" whether IBM could regain lost ground, or they shrugged their shoulders and said they didn't know.

Whether this is good news or not is a matter of perspective. In IDC's view, given the bad press that IBM has had for the past few years, the willingness of all but a handful of CEOs and other top execs to keep an open mind about IBM's prospects is about as positive a signal as a troubled company has any right to expect.

Even better for IBM, when we ran crosstabs for this question against whether the top executives cited IBM as their primary vendor, we found that, in the case of every country but one, execs who were actually buying most of their IT product from IBM were more likely to be sanguine about Big Blue's prospects than their peers who had selected other primary suppliers. Had this not been the case, IBM would presumably face severe problems in holding onto their current base over the coming few years.

That's why the case of that one country with higher opinions about IBM's future among executives for whom IBM is *not* the primary vendor is critical, since it happens to be the United States. Only one-third of U.S. execs that had designated IBM as their primary IT supplier felt that it could probably transform itself into the agile organization required in today's information technology market.

Familiarity may breed cynicism. Certainly U.S. CEOs as a group are all too aware of how quickly major companies can fall from grace. U.S. executives are also likely to be more familiar with the intricacies of the problems that IBM faces and the market conditions within which it must operate.

Both of these factors involve U.S. execs evaluating a U.S.-based company. The national origin of IBM has another effect that should be considered in evaluating this result: In the United States, four out of five top execs cited IBM as their primary vendor, a figure about double the proportion for other countries in the survey base. Within most other countries where the IDC *1994 Global IT Survey* was administered, there are local manufacturers (Fujitsu, NEC, or Hitachi in Japan; ICL in the United Kingdom; SNI in Germany; Bull in France; Olivetti in Italy) that cut into IBM's position as the primary vendor.

This leads to two consequences. First, the U.S. non-primary vendor base for top executives is so small on this question that the results have lower statistical significance than in other countries. Second, the IBM customer base in the United States probably always has a larger proportion who are less than enthusiastic about their supplier. Elsewhere, these customers would go to their local supplier. In the United States, while Digital remains in its doldrums, the alternatives are not so clear.

But there *are* alternatives, which will only become clearer over time. IBM should take the U.S. results on this question as a shot across its prow. The next shot could be in the rigging, or below the water line.

THE GRAY SHEET
Computer Industry REPORT

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The European IT Market Recovery Has Arrived

After stuttering through the early 1990s, the European information technology market is now poised for relatively healthy growth. IDC expects IT spending to increase over 4% in 1994, a rate double that of 1993 and 1992.

The European economy is recovering from its recession earlier and at a faster pace than many observers had anticipated. Although most of the large IT vendors are continuing to tighten their belts, many are returning to profitability after the painful restructuring of the recent past.

While the market drought is finally ending, European IT spending will be divided unevenly across market segments and geographic regions. The United Kingdom and Germany, for example, should outperform the market as a whole whereas Italy and Spain will not benefit from the recovery until next year.

The Business Environment

Until the late 1980s, the European IT market was growing at a higher nominal growth rate than the overall economy, racing to catch up with the penetration rate in the more advanced U.S. market. Since 1989, however, growth rates have declined for a number of reasons including the following:

- A higher penetration of IT in the economy
- Economic recession
- Price erosion in the hardware industry
- Cautious attitudes toward the financial return on IT investment
- IT purchase postponements due to changing usage patterns

August 5, 1994 Vol. 29, No. 19

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Although many of these conditions were also shaping customer expectations in other markets, including North America, unique features of the European market provoked a more intense spending backlash in Europe:

- Customers probably intended to compensate for the overheated buying binge of the 1980s with less enthusiastic spending, even if the most enervating recession in recent memory did not hit.

- The recent heady growth created a large stockpile of technology that could tide customers over through the economic downturn with relatively little new investment.

- Finally, prices remained significantly and artificially higher than in the United States. Therefore, when PC price wars spread from the United States, prices were able to fall much further, with a debilitating effect on the total amount spent on computers in Europe.

As a result, IT spending in Europe could not keep pace with the combination of real GDP growth and inflation and therefore slipped as a proportion of GDP in 1992 and 1993. In the United States, customers weathered the transition with more equanimity, and IT spending continued to outperform GDP.

IDC now expects a revitalization of the European IT market as the recession finally ends and prices stabilize. While businesses and individual consumers regain confidence, market growth may not match the yeasty expansion of the 1980s, but it will follow a measured, realistic, and more stable path.

The European IT Market

The first signs of recovery in IT spending emerged between the last months of 1993 and the first quarter of 1994. The convergence of a series of mutually reinforcing positive factors is driving the turnaround:

- The stabilization of the economic and monetary environment, injecting greater confidence in private and public investment decision processes

- The lowering of price points for commodity technology to levels that attract new demand segments (such as personal communication technology and the small office/home office market) or accelerate substitution in the installed base

- The emergence of a new vision in the deployment of IT hardware, software applications, and services, driven by the need to generate a competitive advantage from the integration of IT applications with business processes

The positive influence of these factors has more than offset the inhibiting effects of the traditional structural weaknesses of the European IT industry:

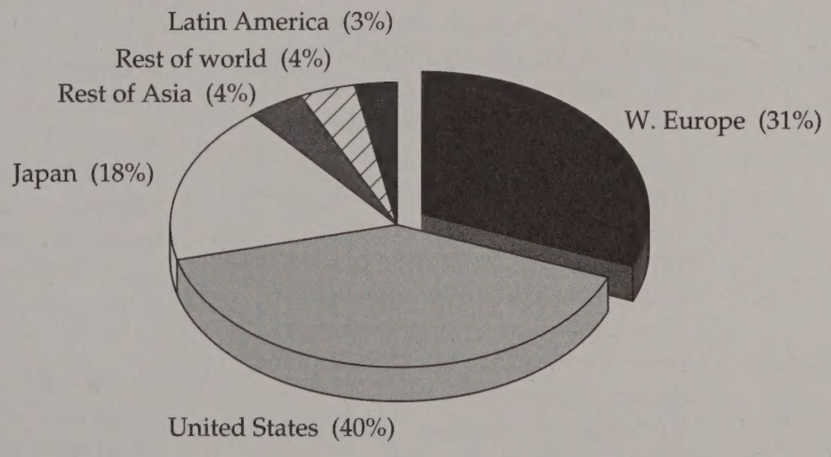
- An excessively granular domestic industry structure, where national champions find it difficult to compete outside their home turf and have insufficient incentive to react fast enough to changing market demands and compete effectively with their U.S. and Japanese competitors

- Heterogeneous distribution channels, reaching different levels of development and margin structures in different countries, which prevent IT commodity vendors from achieving volume sales and value-adding third parties from effectively addressing customer needs

- Disparate pricing policies at various segment levels in different countries, preventing the local IT markets from developing simultaneously with a European average

These factors will continue to distort the shape of the European market until economic integration begins to iron out the most serious anomalies. In the meantime, they will have less effect on the extent of recovery than on who benefits from it. For example, virtually the only vendors with European-wide presence today are American companies. As a result, IDC expects continued short-term gains by U.S. vendors at the expense of local players.

Worldwide IT Market by Region, 1993

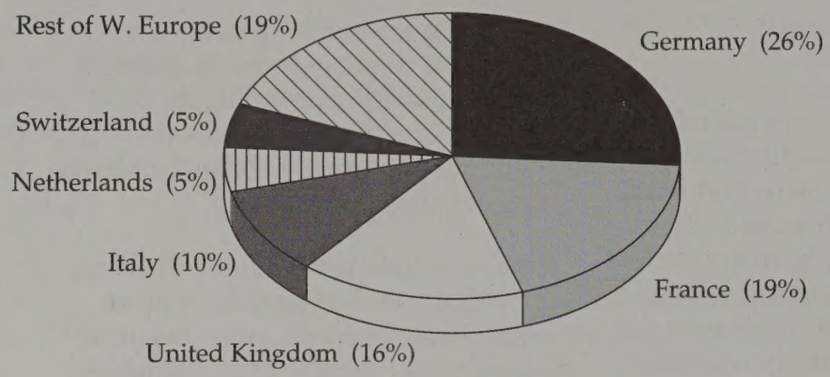


Total = $380 billion

Note: IT market totals do not include processing and network services.

Source: International Data Corporation, 1994

W. European IT Market by Country, 1993



Total = $127 billion

Note: Country IT market totals include processing and network services.

Source: International Data Corporation, 1994

IT Market Performance by Segment

The recovery is assuming distinct directions and shapes depending on which market segments and countries are under inspection.

- In the *hardware* segment, the sharp declines in mainframes (down 12% in local currency value for Europe in 1993) and stagnation in minicomputers and servers (off -3%) have been counterbalanced by a 4% increase in the personal computer market. Over the next two years, the annual decline in mainframe spending will continue, although at a more moderate pace. Demand for larger Unix database servers and smaller LAN servers, however, should help stabilize the European midrange market.

  Downsizing, distributed computing, and the rethinking of the role of mainframes at large IT user sites are at the root of the persistent negative cycle of multiuser systems sales. Decreasing price points, the emergence of new distribution channels, and increased consumer confidence are the accelerators of the PC market unit and value growth.

- The 5% *packaged software* market growth in Europe in 1993, while very moderate in the context of the recent expansion, still significantly outdistanced the industry average for the region. Forward momentum resulted from the surge in Windows-based and network-based system and application software, which more than offset the decline of traditional proprietary mainframe software.

  Healthy PC sales, new and reworked programs to take effect of new operating systems, and software-driven paradigms such as client/server computing should push software spending over the next couple of years closer to 8% annual growth. IDC anticipates that the single-user software market will continue to grow at twice the rate for midrange systems and mainframes.

European IT Market 1992–1998: Value by Category (U.S.$M)*

	1992	1993	1994	1995	1996	1997	1998
Multiuser	18,747	17,526	16,972	16,907	17,330	17,768	18,023
Single user	27,414	28,428	30,245	32,273	34,563	36,995	39,964
Systems	46,161	45,954	47,217	49,180	51,893	54,763	57,987
Data communications hardware	3,215	3,601	3,698	3,693	3,650	3,645	3,628
Hardware	49,376	49,555	50,915	52,873	55,543	58,408	61,614
Packaged software	23,068	24,245	26,073	28,328	30,848	33,466	36,141
Professional services	24,953	26,252	28,219	30,125	32,304	34,424	36,421
Processing services	10,025	10,380	10,739	11,066	11,414	11,793	12,124
Network services	1,737	1,982	2,235	2,560	2,932	3,239	3,612
Support services	15,299	14,836	14,517	14,410	14,400	14,414	14,461
Software and services	75,083	77,696	81,783	86,489	91,899	97,336	102,759
Total	124,459	127,251	132,698	139,361	147,441	155,744	164,374

*All figures at 1993 exchange rates, including 1992 data restated to indicate growth as experienced in local currencies.

Source: International Data Corporation, 1994

European IT Market 1992–1998: Local Currency Growth Rates by Category (%)

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98
Multiuser	–6.5	–3.2	–0.4	2.5	2.5	1.4
Single user	3.7	6.4	6.7	7.1	7.0	8.0
Systems	–0.4	2.7	4.2	5.5	5.5	5.9
Data communications hardware	12.0	2.7	–0.1	–1.2	–0.1	–0.5
Hardware	0.4	2.7	3.8	5.1	5.2	5.5
Packaged software	5.1	7.5	8.6	8.9	8.5	8.0
Professional services	5.2	7.5	6.8	7.2	6.6	5.8
Processing services	3.5	3.5	3.0	3.1	3.3	2.8
Network services	14.1	12.8	14.5	14.6	10.5	11.5
Support services	–3.0	–2.2	–0.7	–0.1	0.1	0.3
Software and services	3.5	5.3	5.8	6.3	5.9	5.6
Total	2.2	4.3	5.0	5.8	5.6	5.5

Source: International Data Corporation, 1994

- In the *services* segment, traditional hardware maintenance is losing ground each year (–3% for Europe in 1993 and only slightly better in 1994–95). Previously, the strong market for professional services more than compensated for this shortfall, but in 1993 this segment grew only 5%. Due to the recession, IS organizations trimmed their budgets for custom software while the competition among vendors has been heating up as traditional systems vendors like IBM and ICL cut into the business of services specialists.

  IDC expects similar issues to keep overall professional services growth in Europe in the upper single digits for the next couple of years. Within professional services, IT consulting — particularly in areas like business process reengineering (BPR) and outsourcing, including facilities management — will do considerably better, reaching growth in the low double digits.

  Far more than hardware and software, though, the services market is inherently localized. Patterns vary widely among countries, with outsourcing very popular in the United Kingdom, for instance, but only a minor presence in France.

As a result of these crosscurrents, the hardware segment is expected to contribute to only 38% of overall 1994 European IT expenditures, compared with a 42% contribution in 1991. More surprisingly, perhaps, single-user systems (personal computers and workstations) will account for 59% of the hardware market in 1994. Meanwhile, packaged software and professional services will account for some 20% and 21% of the total market, respectively.

National Variations

As the disparate opportunities for outsourcing suggest, the most important feature of the European IT market recovery remains the wide spectrum of national market environments. Despite the dreams of Maastricht, national markets will continue to differ from each other in terms of strength in related industries, sophistication of IT usage, and level of competition.

The more advanced or favorable these factors are in individual countries, the faster the process of recovery will be:

- The United Kingdom's IT market, which is expected to accelerate from the 5% pace set in 1993, is the best example of this correlation. Competition is high relative to other European markets (nine vendors account for 40% of the market), and IT users are usually among the first to implement new technology and applications. In response, vendors must continually renew and update their product offerings to keep up with demand. These factors, coupled with the U.K.'s position as the first economy to bottom out of recession, have put the country in a leading position for growth.

- The market forces of the EFTA countries (notably Austria, Finland, Norway, Sweden, and Switzerland) are similar to those of the United Kingdom in terms of vendor competition and the sophistication of users. The IT market expanded nearly 5% in 1993, yet persistently weak economic conditions will hold growth rates slightly behind those of the United Kingdom.

European IT Market 1992-1998: Value by Country (U.S.$M)*

	1992	1993	1994	1995	1996	1997	1998
Austria	2,654	2,783	2,917	3,073	3,246	3,420	3,598
Belgium	4,108	4,264	4,375	4,502	4,643	4,771	4,886
Denmark	3,121	3,230	3,405	3,623	3,857	4,056	4,246
Finland	1,560	1,636	1,746	1,890	1,998	2,098	2,175
France	23,893	23,983	24,522	25,547	26,879	28,186	29,446
Germany	33,006	33,714	35,430	37,666	40,545	43,615	47,128
Italy	12,760	12,741	12,977	13,474	14,132	15,049	16,022
Netherlands	6,419	6,661	7,000	7,289	7,558	7,801	7,931
Norway	2,406	2,556	2,712	2,870	3,017	3,129	3,219
Spain	5,209	4,849	4,869	5,046	5,326	5,642	5,996
Sweden	4,316	4,592	4,897	5,156	5,412	5,669	5,852
Switzerland	5,744	5,914	6,211	6,625	7,047	7,521	8,078
United Kingdom	19,263	20,328	21,636	22,600	23,781	24,787	25,799
Europe	124,459	127,251	132,698	139,361	147,441	155,744	164,37

*All figures at 1993 exchange rates, including 1992 data restated to indicate growth as experienced in local currencies.

Source: International Data Corporation, 1994

European IT Market 1992–1998: Local Currency Growth Rates by Country (%)

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98
Austria	4.9	4.8	5.3	5.6	5.4	5.2
Belgium	3.8	2.6	2.9	3.1	2.7	2.4
Denmark	3.5	5.4	6.4	6.5	5.2	4.7
Finland	4.8	6.7	8.3	5.7	5.0	3.6
France	0.4	2.2	4.2	5.2	4.9	4.5
Germany	2.1	5.1	6.3	7.6	7.6	8.1
Italy	–0.1	1.8	3.8	4.9	6.5	6.5
Netherlands	3.8	5.1	4.1	3.7	3.2	1.7
Norway	6.2	6.1	5.8	5.1	3.7	2.8
Spain	–6.9	0.4	3.6	5.6	5.9	6.3
Sweden	6.4	6.6	5.3	5.0	4.7	3.2
Switzerland	3.0	5.0	6.7	6.4	6.7	7.4
United Kingdom	5.5	6.4	4.5	5.2	4.2	4.1
Europe	2.2	4.3	5.0	5.8	5.6	5.5

Source: International Data Corporation, 1994

- Germany has suffered from extremely low levels of business and consumer confidence. German unification initially generated a surge in IT purchases in 1992, but became a bottleneck to economic development in 1993 as extensive government expenditures and high interest rates (adopted to reduce inflation) restrained business investment. The IT market grew only 2% in 1993. However, the market's fundamental strengths are finally beginning to reassert themselves, and IT user caution is beginning to wane. IDC expects Germany to outperform the European average for 1994 and 1995.

- The IT market in France expanded by less than 1% in 1993. IT purchasers are still affected by a higher presence of traditional mainframe-centered environments and are slow to migrate to new architectures. The adoption of distributed computing and client/server architectures, therefore, is not strong enough to offset the negative effects of low user confidence and a weak economy on purchases of large asset hardware.

- The Italian IT market recorded its first-ever decline in 1993 (–0.1%). The impact of the economic recession has been magnified by political scandals that have delayed or completely stopped major public sector expenditure decisions. Public sector IT investment accounts for 20% of Italy's total IT expenditures. The industrial sector is also polarized by a large number of small and medium-sized companies with modest high-tech usage and a very small number of large companies that keep pace with technology upgrades. This not only limits the size of Italy's IT expenditures relative to other countries', but also prevents larger sectors of the national economy from following the same quantitative and qualitative purchasing patterns as other countries in Europe.

- The worst performer of the national IT markets in 1993 was Spain, with a decline of 7%. The critical economic situation and the highest unemployment rate in Europe have also pushed confidence indicators and user purchase attitudes to their lowest level ever. In 1994, the IT market is expected to be flat at best.

As a result of these differing dynamics, the market shares of the top countries are undergoing small readjustments. By 1994, IDC expects that the United Kingdom will represent over 16.0% of the European IT market, up a percentage point from 1991, and France's share will have decreased a point to 18.5%. Germany will pick up two percentage points, reaching almost 28.0%, while Italy slips to under 10.0% and Spain to under 4.0%.

— This article was written for *The Gray Sheet* by Luisa Bordoni, manager of IDC's European IT Market Center.

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IT Industry Structure — Phases 3 and 4

"As for the mini manufacturers, if their current shipments won't be affected by the microprocessor revolution, their prices and the eventual look of their product line will. They can choose to co-opt the technology, or ignore it and focus on the lower end of the mainframe market. But when the 16-bit chip hits the street (and then the 32-bit machine) look for a radical change in product architecture, if not a rearrangement of the industry hierarchy."

— IDC's *Gray Sheet*, 1974

Of all the many insights of IDC's first research director, James Peacock, this has to be one of the most prescient. Although microprocessors have done wondrous things during the last 15 years, it is only now that they are fully reconfiguring the computer hardware and software industries.

Whereas in the past PCs, workstations, minicomputers, and mainframes had distinctive processor architectures, they are today increasingly based around common 32-bit designs. Intel Pentium, IBM Power, Digital Alpha, HP-PA, and Sun Sparc can each define a full range of PC, workstation, server, minicomputer, and even mainframe architectures.

At the same time, software, which historically has been tied to specific platforms, is also becoming more generic in nature. Products such as NT and Unix obviously can define PC-, workstation-, server-, and, at least with Unix, increasingly mainframe-class architectures. The traditional divide between PC software companies and multiuser software companies is rapidly fading as everyone enters the "client/server" software business.

All of this is leading to a significant evolution of the current industry structure, an evolution that IDC views as occurring in four major stages — past, current, and future:

Phase 1 — Integrated systems model. Companies such as IBM and Digital build and provide everything from chips to services. Third-party software, peripheral, and maintenance companies specialize in supporting particular systems-company environments, functioning largely as satellites to the central mother company. (Phase length: 17 years)

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Phase 2 — Highly dis-integrated. In the IT industry's equivalent of the Big Bang, IBM's outsourcing of microprocessor and systems software for PCs revolutionizes and fragments the entire industry. The business is characterized by highly specialized companies focused on each level of the value chain. The overall rate of innovation increases dramatically. (Phase length: 13 years)

Phase 3 — Natural dis-integration. A layered hardware/software/services industry structure remains intact, but technological evolution overcomes the unnaturalness of the highly dis-integrated industry. The technology base for both the hardware and software businesses becomes more homogeneous, requiring less specialization. Products such as PowerPC and Windows NT begin to erase the traditional boundary between single-user and multi-user hardware and software products. (Phase length: seven years?)

Phase 4 — Consumer-driven. Consumer products, particularly CATV set-top boxes, create a second volume microprocessor market that rivals the PC base in units. This lays the foundation for new architectures and new economics that challenge today's vendors in the home — and eventually in business as well.

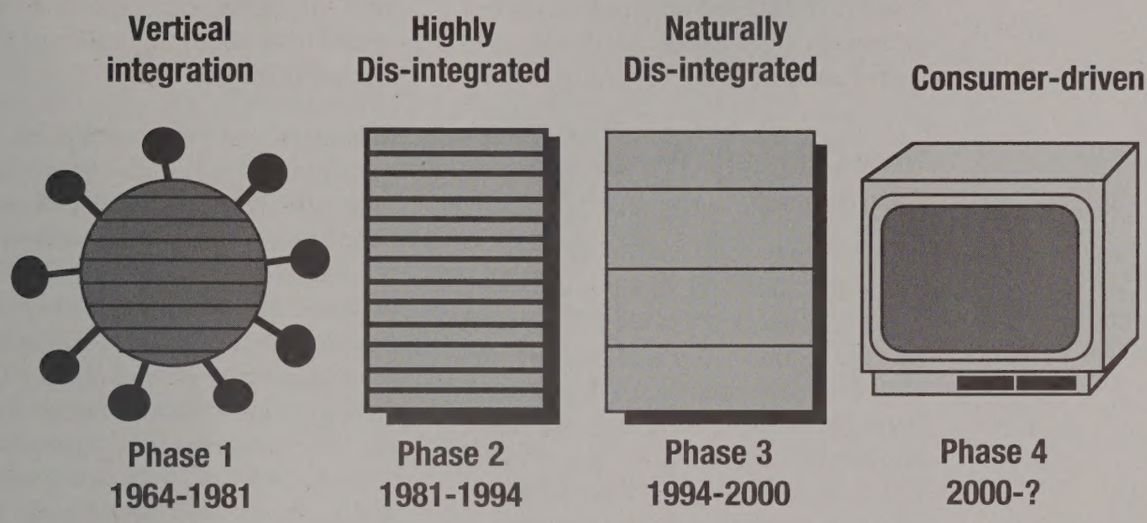
Recent vendor behavior suggests that we have clearly entered the Phase Three era. IBM has increasingly put all of its processor development into one group centered around the Power architecture. Under the banner of "servers," Compaq, Apple, Dell, and AST are now moving much more aggressively into traditional systems markets. Sun's products span a broad area from the desktop to the mainframe via its cooperation with Amdahl. To avoid internal friction, Digital recently put all of its Alpha and Intel products under a single executive, Enrico Pesatori.

Not surprisingly, as Phase Three begins, much of Phase Two still remains. IBM straddles both phases with its large Intel and growing PowerPC businesses. Hewlett-Packard and Digital still don't position their RISC offerings as viable PC alternatives.

The software transformation is equally significant. The distinction between a LAN OS and a server OS is disappearing; it adds an unnecessary layer of complication. Paradox and Access are now clearly in competition with low-end products from Sybase and Oracle. Microsoft, Lotus, and other former pure-PC companies are increasingly focused on group and enterprise products.

Like microprocessors, operating systems remain at the center of change. Today, there are four ways operating systems come to market: (1) proprietary software from hardware vendors (MVS, VMS, etc.); (2) nonproprietary software from hardware vendors (OS/2, Taligent); (3) from software vendors (DOS, Chicago, NT, NetWare, etc.); or (4) from a mix of all of the above Unix (AIX, SCO, Solaris).

Stages of Industry Evolution, 1964-2000



Source: International Data Corporation, 1994

Is there any question that the pure software company approach is winning the market battle? The move away from hardware vendors has the effect of reducing the number of operating system vendors as the operating system business shifts from hardware- to software-scale economies. Furthermore, software-company ownership of most or all of the operating system business represents the final stage in the separation of the hardware and software industries — a separation that began in 1981 with the introduction of the IBM PC and MS-DOS.

As the markets become more homogeneous, the stakes are raised. One of the reasons IBM needs to fight so hard to establish the Power architecture is that if it fails, the Intel-based world will likely sweep over not just the PC industry, but much of the larger systems business as well. Overall microprocessor competitiveness and scale economies are now driven by volume — which means that without a viable desktop position, it will be difficult for any general-purpose microprocessor to survive.

Selected Hardware Companies' Current Approaches to Desktop/System Architectures

All-Intel	All-RISC	Hybrid
AT&T GIS	IBM*	HP
Unisys	Sun	Digital
Compaq	Apple*	Europeans
AST	Silicon Graphics	Japanese

*Although IBM is obviously a leading supplier of 86-architecture PCs, its preferred strategy is clearly to supplant Intel with the Power architecture if and as soon as reality allows. Similarly, although Apple still sells 68K-based systems, it is also moving to Power as fast as possible.

Source: International Data Corporation, 1994

But the flip side of this threat is opportunity. The shift to 32-bit microprocessors offers today's systems companies perhaps their best (or only) chance to recapture at least some of the microprocessor business bestowed upon Intel in the early 1980s. This recapturing is much more likely to happen in the long term than in the short term. However,

regardless of how the RISC/CISC struggle plays out, the movement toward a more homogenized hardware vendor/supplier structure seems assured.

How Long Will Phase Three Last?

In an industry with as much dynamism as the IT business, structures are constantly being challenged by new technologies and competitors. However, the emergence of this more homogeneous 32-bit system structure has certain steady state characteristics, at least in terms of the evolution of the market for general-purpose machines. In terms of today's computer markets, the eventual shift to 64-bit systems appears likely to be both slow and evolutionary without any obvious impact on the way the industry is currently organized.

Nevertheless, emerging consumer markets could radically reshape the microprocessor business in a relatively short period of time. The potential volumes for 64-bit microprocessors for use in CATV set-top boxes could match or eventually even exceed those for today's PC business. These new MPUs will need to have very high performance and very low costs, a specification well-suited to challenging today's PC market price points.

Moreover, computers designed to be highly visual and three dimensional (along the lines of today's Silicon Graphics systems) could well require — at least initially — close links between hardware, software, and semiconductor providers. That Silicon Graphics drives its business by taking an integrated system/microprocessor/software approach suggests that someday a Phase 1-like integrated history might well repeat itself. In all probability, such an offering would come from some sort of "virtual company" alliance between three different hardware, software, and semiconductor providers.

More generally, the emergence of a high-volume, consumer-driven microprocessor market is further evidence that the overall IT market is far from mature, and industry structures should therefore continue to shift. The shortening cycles seen in IDC's four-phase framework suggest that the rate of change continues to accelerate.

Have the Systems Companies Turned the Corner?

During the 1990s, the major U.S., European, and Japanese systems companies in aggregate have lost the staggering total of some $30 billion. Clearly, this level of pain could not be sustained, and for many of these companies this decade has been characterized by a sense of heightening desperation.

Recent events, however, appear to be more positive. In addition to HP's continued prosperity and Unisys's modest profits, IBM, AT&T GIS, and Groupe Bull's results have all exceeded expectations. Olivetti is talking about being in the black by the end of the year, while Digital's recent reorganization seems sound and may put the company on a path to recovery.

Even in the troubled Japanese market, an atmosphere of guarded optimism has started to emerge.

Certainly some of this optimism stems from an improving worldwide economy. The United States continues its steady expansion; Europe has clearly stopped declining and in the eyes of most has begun to recover; and political paralysis notwithstanding, the Japanese IT market also seems to have come out of its free-fall. The recovery of the major markets coupled with continued growth in Southeast Asia and Latin America puts the wind behind the industry's back for the first time since the late 1980s.

But more than just macroeconomic forces are at work. Most important, the systems companies' business models are showing signs of life. Within major customer organizations, MIS influence is at least holding its own and if anything actually increasing. Outsourcing, although popular within specific domains such as software development and wide area networking, is not sweeping away existing in-house structures. System vendors and MIS grew up with one another, and what is good for MIS is almost always good for the systems companies. MIS continues to want platforms, tools, and support, and the systems companies are still generally the most direct means of acquiring them. The opportunity is still there.

Exploiting this opportunity has been the systems companies' biggest problem, and it seems fair to say that over the last five to ten years these companies have been their own worst enemies, often failing to adapt to changing circumstances and thereby not taking advantage of some substantial new business.

Since much of the challenge has been internal, perhaps the most promising — and certainly potentially the most sustainable — aspect of the current recovery is that many of the systems companies finally do seem to "get it." Recent philosophical and organizational decisions reflect a healthy recognition of how to compete in today's world.

At its core, the emerging system company strategies tend to reflect two basic principles, one conceptual, the other practical: (1) that any products made for internal use need to be successfully sold into the external market as well, and (2) that experience strongly suggests that system vendors' competencies lie in hardware platforms and field services, but not in software.

These two principles are the driving force behind a three-part corporate framework:

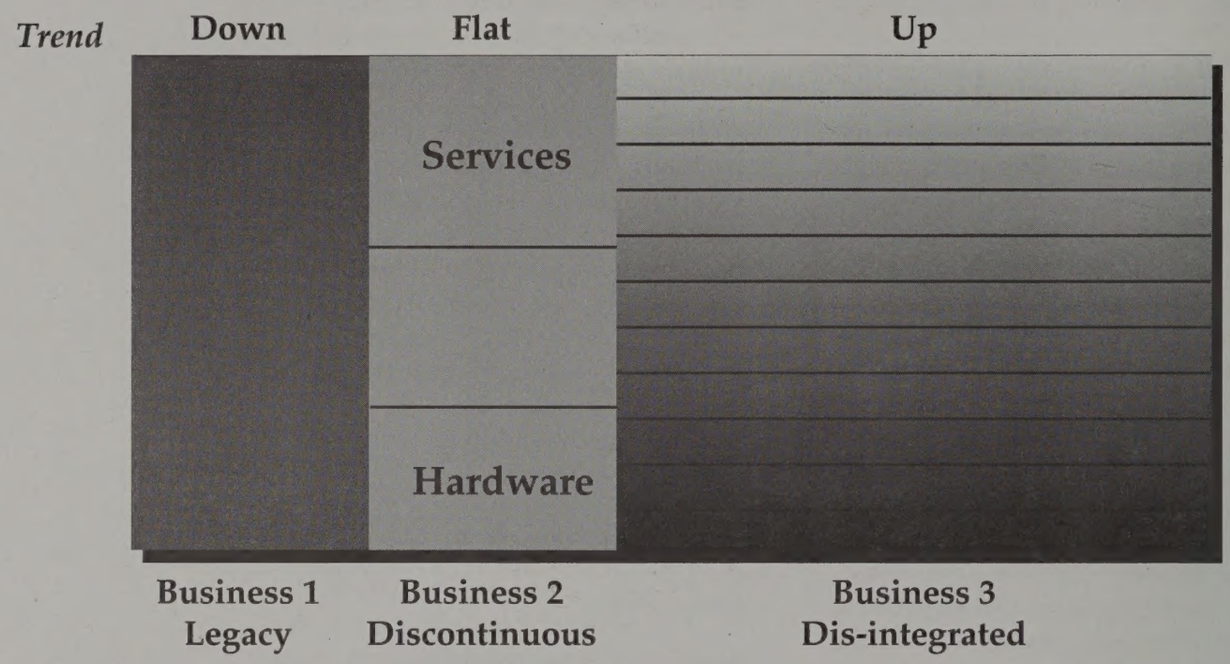
Business 1 — legacy systems. The traditional proprietary systems business, be it S/370, VMS, or AS/400, remains in various states of managed decline.

Business 2 — discontinuous systems. This emerging opportunity recognizes that system vendor strengths are in hardware and services. Bundling these two strengths with market-leading software — Oracle, Notes, NT, NetWare, etc. — is the best way of delivering these strengths to customers in an attractive package.

Business 3 — dis-integrated products and services. In addition to the integrated offerings described above, each major part of the company must compete independently and externally in particular parts of the industry value chain. The Business 3 model is basically the same as for today's focused industry leaders. Sales are mostly through indirect channels. This should be the fastest-growing part of a systems company business.

In many ways, Business 2 is the natural evolution from Business 1 and is becoming the dominant systems model for companies such as HP,

Systems Company Business Models



Source: International Data Corporation, 1994

Digital, and AT&T GIS. The recent Microsoft/ICL deal reflects similar thinking. Both businesses 1 and 2 are defined by large, direct field and service divisions, which provide a broad range of integrated systems solutions. Quite often the field force is specialized by industry as a means of better understanding customer challenges.

IBM stands alone in resisting this move toward a discontinuous systems model. Unlike the others, IBM still is making large commitments to its own software — OS/2, AIX, Workplace OS, DB2, CICS, etc. This is understandable given IBM's large position in many software areas, but nevertheless it is risky. In an integrated systems sale, one's offerings are only as strong as the weakest link. By committing so fully to its own software, IBM's platform and services business also assumes additional risk.

Taken together, the legacy systems and discontinuous businesses should allow for flat to moderately increasing total market revenues. In other words, the growth of the discontinuous business should be enough to offset the declines in the legacy systems realm. However, stabilizing the revenue base is about the best that can be reasonably expected.

It is in Business 3, the dis-integrated activities, where growth is to be found. This is already the case today as evidenced by HP's printer business or many systems companies' PC divisions. But with the exception of HP and ICL, U.S. and European system companies have been very slow to adopt the autonomous business unit structures necessary to keep pace with the Intels, Seagates, and Ciscos of the world. The major Japanese systems vendors have in many ways had these dis-integrated organizational structures in place for

some time. Although the problems they face are often lumped in with those of Western systems companies, they are actually quite different in a number of significant regards.

Recent organization shifts at Digital, AT&T GIS, and Bull reflect the acceptance of this dis-integrated Business 3 thinking. Once again, IBM stands a bit out of the mainstream. Since his arrival in 1993, IBM CEO Lou Gerstner has sent a clear message that leverage and synergy are at the heart of his strategy. Therefore, full business-unit autonomy must be reigned in to at least some extent — witness the IBM PC Company and Adstar. IBM seems to be trying to have things both ways, using semiautonomous structures to seek both accountability and leverage, making for a delicate balancing act.

How the Businesses Fit Together

Since the emerging discontinuous approach is the natural evolution from the legacy systems business, the relationship between these two activities is straightforward and largely a matter of managing the migration strategies of existing accounts and using the discontinuous approach to attract new ones. It is the crucial connection between the dis-integrated and discontinuous businesses that requires additional explanation.

Essentially, success in the dis-integrated business is required for the discontinuous business to remain viable. Unless the products that underlie the discontinuous model are successful in the open market, they are unlikely to face the necessary market pressures and achieve the necessary volumes to remain competitive. In short, the success of increasingly commodity products cannot be assured through largely bundled hardware/software/services offerings.

From an academic perspective, there is a pure scale-economy argument behind this. Software, hardware, and services have very different underlying economics. Software scale economies are almost infinite, hardware scale economies are very significant, and services scale economies are modest, or possibly even negative. Consequently, the natural sizes of these three businesses are quite different, making it impossible for an integrated approach on its own to achieve the appropriate scale economies across all three areas.

The way around this dilemma is to reach dis-integrated scale economies by using indirect channels for all significant product endeavors. HP has understood this reasoning all along, but a renewed emphasis on channels is at the heart of new initiatives at Digital and AT&T GIS. In contrast, Unisys is not pushing as aggressively in this area, and for this reason it is on more of a pure services track.

How Does All of This Play Out?

In sum, there are two main scenarios for the systems companies. The growth scenario has these vendors recognizing that the discontinuous approach is the best way to maintain its traditional full-service role in the industry. The companies that build competitive platforms and run with the right market software will achieve enough growth to offset the inevitable declines in their legacy systems business. They will also remain strong competition for the pure service providers. This discontinuous model will be sustained by successfully pushing the underlying platforms through indirect channels to maintain the necessary competitiveness, scale economies, and product brand marketing power.

The second scenario is one of managed or possibly unmanaged transition to an increasingly pure service provider role. In this scheme, the inability to compete (or the decision not to compete) in indirect commodity markets undermines the ability to compete in the discontinuous business. This scenario leaves these systems companies with a declining legacy systems business and a largely product-independent services/systems integration capability. New revenues from the latter are unlikely to offset declines in the former, resulting in a steadily shrinking revenue base. If planned for, this can be managed with modest profits; if unplanned for, it can be disastrous.

Most of the existing players can be slotted into these scenarios. But what about IBM? IBM is unusual in at least three respects: (1) its legacy business is the strongest of the breed and therefore will wither more slowly than the others; (2) its large software positions make it more difficult to pursue the discontinuous approach (even though IBM could be extremely successful should it really pursue this business); and (3) IBM is still unwilling to grant high degrees of autonomy to its array of dis-integrated activities.

Of these, it is the second point that is most important. The first is a luxury, but it clearly cannot sustain a $60 billion company, while the third can and most likely will be fine-tuned over time. It is the decision to rely on its own software — OS/2, DB2, AIX, Workplace OS, etc., that is the differentiating bet. On the one hand, reestablishing the preeminence of IBM software is probably the only way to restore significant portions of the dominant position the company once enjoyed. However, betting on its own software also puts IBM's hardware and services strategies at risk. The rewards could be great, but from the current perspective they still seem somewhat unlikely. There is no more important issue within the company.

Have systems companies turned the corner? In the sense of understanding the rules of the game and knowing how to position themselves against their younger competitors, probably yes. In the sense of truly turning around the disastrous results of the last few years and gaining or at least holding market share, the picture is more mixed.

Ten years ago, systems companies had many superior technologies that were artificially constrained by inappropriate business models. Today, the business model problem has been largely corrected, but most of the technology edge has vanished. At virtually every level of the industry value chain, the market leader is a dedicated, focused company that is much larger in its particular area than any of the systems companies with the exception of HP in printers and IBM in PCs, storage, software, and a number of other segments.

Perhaps the best way of looking at the changes being made now is that they give the systems companies a chance to hold onto what they have and possibly regain some of what has been lost. But just as it took a decade or more for these same companies to lose their leadership position to newer, smaller rivals, any significant regaining will also take considerable time. The irony is that within each stage of the value chain, it is now the systems companies that are often the new upstarts that have to prove themselves against larger, more established players.

THE GRAY SHEET
Computer Industry
REPORT

Published continuously since 1964.

Eastern Europe and Former USSR: Hardware Spending Flat, Vendors Seek New Niches

The remarkable growth in the computer hardware markets of East/East Central Europe from 1989 to 1993 has subsided significantly in the past 12 months. Nowhere is the new trend more clear than in Hungary and the Czech Republic. Traditionally one of East Europe's more sophisticated, fastest-growing markets, total hardware revenues in Hungary stagnated last year in the face of a sharp decline in multiuser system sales and a moderate 5% increase in the demand for PCs. In the Czech Republic both local and international vendors reported a notable drop in hardware revenues in the wake of falling demand and the establishment of an independent Slovakian state.

What is driving this significant shift in IT spending patterns, and what does the future hold for these high-growth, and high-opportunity, IT markets?

On one hand, expectations are high. After several years of recession, the first signs of economic recovery are discernible. Inflation has slowed, the private sector now accounts for more than 50% of annual GDP, unemployment appears to have peaked, regional foreign investment has increased substantially, and the dramatic slide in industrial production has been arrested. The Polish government even reported a 4% increase in GDP in 1993. A similar development is projected for Hungary and the Czech Republic in 1994.

So, it follows that the near-term IT industry outlook should be somewhat more stable than in the past several years. However, it's not that simple. The frenzy of spending and investment in IT hardware of the last three years may be catching up with the market. Much of the pent-up demand for IT hardware in the region has been met, and as a result IT suppliers are gradually shifting their focus toward software and services.

September 16, 1994 Vol. 29, No. 21

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In addition, Eastern European and former USSR IT markets are reaching the natural limitations of country demographics (population, GDP, and economic infrastructure). Many high-profile sectors like banking/financial services, insurance, and government administration have received substantial IT hardware funding over the last two years as a consequence of restructuring and modernization. They are close to being fully computerized, at least in terms of hardware. Hardware growth will necessarily come from more price-sensitive vertical markets such as small businesses and manufacturing.

As a result, IT market growth in East Central Europe will be centered upon software development, networking communications, consulting, and professional services. This development is evident both in the activities of international IT vendors, which are now moving to expand local product offerings to incorporate the full range of software and professional services and the plethora of local IT firms presently involved in software development, support, and services.

Impact on Local Suppliers

The transition from hardware-based market growth to software and services is having a decisive impact on the fortunes of the region's local IT companies, initiating a market consolidation. The 1992–94 period has proven decisive for them as they struggle simultaneously with internal restructuring, redefining market strategies, and reducing cost structures in the face of declining prices and more sophisticated competition from outside vendors. The heady days of 200% margins on PCs and office equipment have given way to a lethal combination of falling margins and prices, limited capital availability, high interest rates, and very competitive international name-brand vendors.

Although many local firms have had to terminate operations as a consequence, most have responded by adopting several policies aimed at enhancing competitiveness. Many have chosen to diversify into other IT products or to streamline their overall product portfolios. They are attempting to improve the quality of their computer and related services offerings, often by developing value-added services and systems integration capabilities, such as networking and consulting, with a marketing focus on larger accounts or small businesses. Some local suppliers have explored alliances with name-brand vendors, giving them a competitive advantage against unbranded PC suppliers.

Compounding the woes of local firms has been a notable change in end-user requirements, which has forced them as well as brand-name vendors to redefine product and marketing strategies. Price remains the defining buying criterion; nevertheless, local end users are increasingly giving greater consideration to other factors such as quality, applications, and value-added services like support and training.

The result has been the emergence of a new market structure in the region, pitting a handful of equipment suppliers/traders (now largely represented by international vendors) against a very competitive community of local value-added resellers, software-development companies, systems integrators, and service providers.

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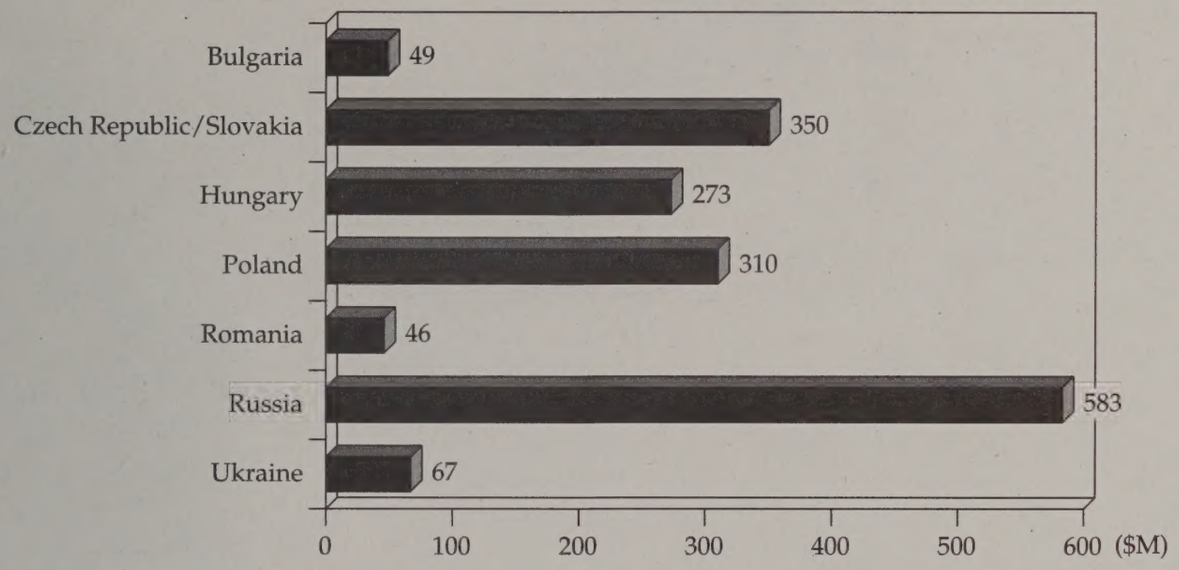
1993 IT Hardware Markets of Eastern and Central Europe, $M



Source: International Data Corporation, 1994

International vendors now fully control the dynamics of a number of technology markets such as multi-user systems, printers, and office equipment. They have also made significant inroads into the markets for PCs, packaged software, and software and services.

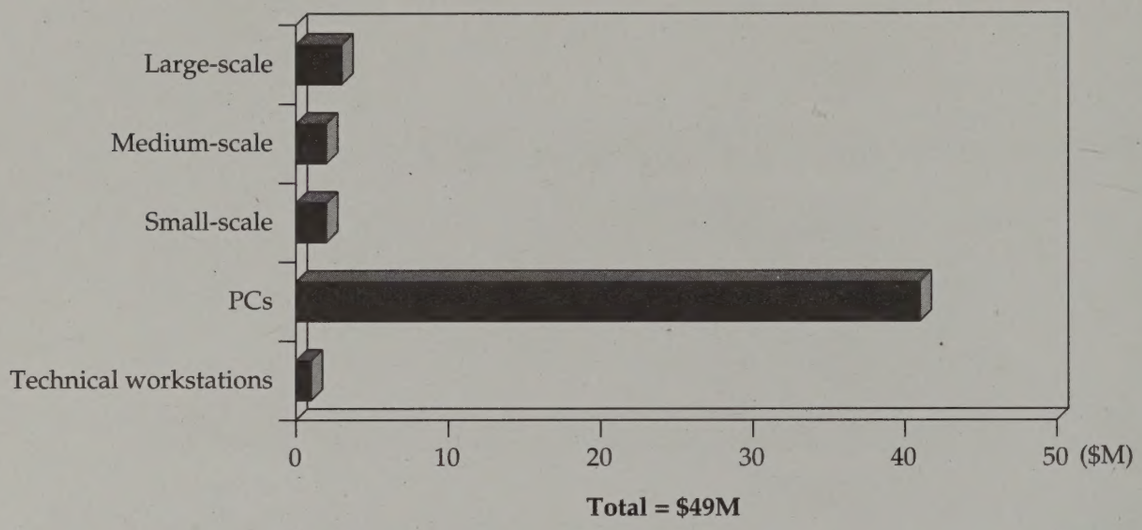
This issue of *The Gray Sheet* will focus on the emerging IT markets of Eastern Europe and the former USSR. In examining these markets, we treat East Central Europe and the Commonwealth of Independent States (CIS) differently. The strong hardware-market growth characteristic of the smaller East Europe countries in the 1989–93 period will now move further east to some of the more populous countries of the CIS, where demographics will impact on sales volumes. This factor was instrumental in facilitating Poland's emergence as the largest market among the East Europe countries in 1993. The sheer sizes and economic potential of the Russian Republic and Ukraine portend significant hardware sales in their IT short markets over the next 10 years.

The Bulgarian IT Market

The value of all computer hardware shipments in Bulgaria reached an estimated $48 million in 1993. End-user purchases are overwhelmingly oriented to personal computers, which comprise 85% of the market value. The remainder is concentrated on small-scale systems and technical workstations, with little vendor activity related to sales of high-end mainframes. The country's evolving private sector will serve as the primary source of computer market growth, particularly for sales of PCs, software, and office equipment. The high ratio of private firms to installed personal computers indicates that many companies are holding off purchases of IT equipment. Moreover, a number of state organizations are still not sufficiently equipped with computers and constitute a potentially large market.

The Bulgarian PC market reached $41 million in 1993. The market is controlled by six local companies, which act as assemblers and resellers of name-brand equipment as well as

Value of 1993 IT Hardware Shipments in Bulgaria, $M



Total = $49M

Source: International Data Corporation, 1994

component distributors. There is also a considerable reexport of equipment to other countries. In fact, Bulgaria has become an important staging point for sales of PCs to the CIS, Macedonia, Albania, and the former Yugoslavia.

Low price and direct sales were key factors to achieving success in the PC market in 1993. Due to strong local competition, IT companies have stepped up their efforts to improve local visibility by increasing advertising and marketing, product diversification, and vertical-market specialization. Currency reform continues to have a heavy impact on the overall dynamics of the country's PC market, producing a market consolidation among local personal computer firms. Price continues to be the most important buying criterion for Bulgarian end users considering the purchase of PC technology.

The 1993 multiuser systems market in Bulgaria was valued at $7 million. Most multiuser hardware shipment activity was confined to the low end of the market, with small-scale systems consisting of minicomputers, Unix-based servers, workstation servers, and double-processor personal computers. Only one shipment of a large-scale mainframe was recorded.

Technical workstations represent the most dynamic segment of the Unix hardware market, and overall shipments reached 35 systems, consisting largely of standalone stations. This figure represents a 16% increase over 1992 shipments. The workstation/workstation server market is expected to grow 40% over the next five years.

Czech and Slovak Republics

Overall 1993 IT hardware market spending reached $347 million in the Czech and Slovak Republics, with personal computers accounting for 63% of that amount. Small-scale systems also achieved 16% share of the market — a higher percentage than in other countries of the region. The IT market in the two republics is projected to grow by more than 16% annually through 1995. Most shipment activity will take place at the low end of the market, particularly for small-scale proprietary systems, Unix-based machines, network servers, PCs, printers, and office equipment.

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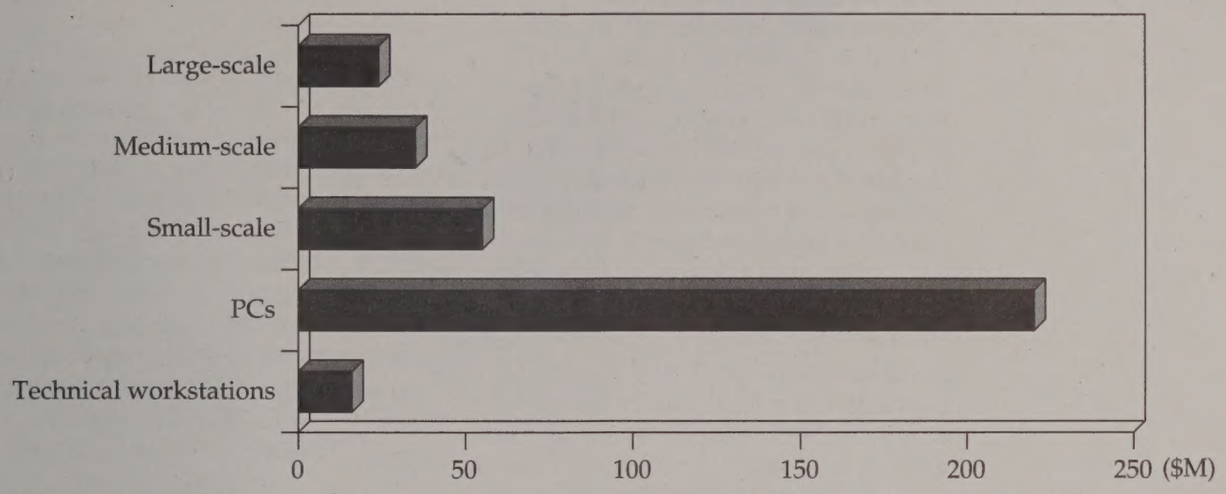
Value of 1993 IT Hardware Shipments in Czech Republic/Slovakia, $M



Total = $350M

Source: International Data Corporation, 1994

One consequence of the country's dissolution is that two fundamentally different IT markets appear to have emerged. While the financial stability of the Czech Republic continues to facilitate growth in the demand for computers of all system size classes, payment problems in Slovakia are limiting most IT purchases to personal computers and related technologies.

The 1993 partition presented substantial problems for local PC assemblers in the Czech Republic, which lost nearly a third of their market overnight. International vendors are posing a significant challenge to local assemblers, as evidenced by the positions of Escom, Dell, and DTK, which account for almost half of all PC unit shipments. In contrast, major local assembly companies are virtually absent in the Slovakian market. The position of the top vendor, DTK, is a reflection of competitive pricing and an extensive local distribution infrastructure. Both IBM and Acer benefited from the presence of strong local distributors, as well as significant sales into government administration and banking.

In 1993, the multiuser systems market in the Czech and Slovak Republics was valued at $114 million. Overall, unit shipments are projected to grow at an annual rate of 12% through 1995. Most shipment activity will take place at the low end of the market, particularly for small-scale proprietary systems, Unix-based machines, network servers, and client/server technology.

The former Czechoslovakia presided over the largest workstation market in the region in 1993, accounting for over half of all unit shipments. Several large contracts in government administration and strong sales to the manufacturing sector supported market growth. The Czech and Slovakian markets possess high growth potential in the long term, considering the composition of their industrial base, the liquidity of the average enterprise, the low level of foreign debt, and the probability of large-scale foreign direct investment.

Software and services is one sector of the IT market in which local firms have competed effectively with outside vendors. Nonetheless, Western software and services companies still control a large part of this market.

Opportunities for IT consulting and the management of large-scale projects have led a number of independent software and services vendors, as well as the services units of major hardware vendors, to initiate operations in this marketplace. The Czech Republic has one of the most dynamic markets for relational database management systems in the East Central European region.

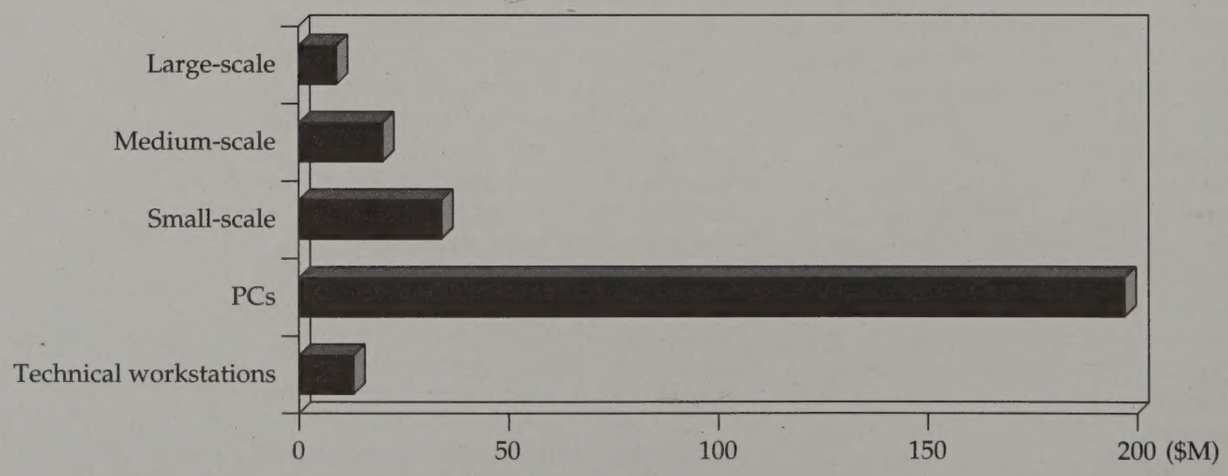
Hungary

Large-scale infrastructure projects in banking and government administration facilitated ongoing dynamic growth in Hungary's market for computer hardware. Shipments of all computer hardware totaled an estimated $273 million in 1993, with PCs accounting for 72% of that figure. The value of Hungary's information technology hardware market is expected to grow at an annual rate of just under 10% through 1995. Most vendor activity will be confined to the low end of the market, particularly small-scale systems, Unix-based servers and workstations, personal computers, data communications hardware, and office equipment items. Demand will stem largely from three vertical markets: the evolving private sector, banking/financial services, and government administration.

PC unit shipments climbed just 5% to 106,240 in 1993. This represents the first year since the revolution that the Hungarian market has not grown by more than 10%, suggesting that the initial high demand for PCs has stabilized. While the 286 size-class installed base in most Western countries would offer significant replacement potential, there generally is not an enormous replacement market for old PCs in Eastern Europe. The machines tend to be utilized until they are irreparable. Thus, the market is not expected to expand in the future at the double-digit growth rates experienced in the past. Despite reduced growth in unit shipments, the value of the Hungarian PC market increased a dramatic 23% to $197.6 million in 1993, due to increasing international vendor sales of higher-priced PCs.

Most multiuser hardware shipment activity was confined to the low end of the market. Small-scale systems consisting of minicomputers, Unix-based servers, workstation servers,

Value of 1993 IT Hardware Shipments in Hungary, $M



Total = $273M

Source: International Data Corporation, 1994

and double-processor personal computers accounted for 83% of the 723 new machines installed in 1993. Less expensive small-scale machines produced 12% of total hardware revenues, the most of any multiuser size class.

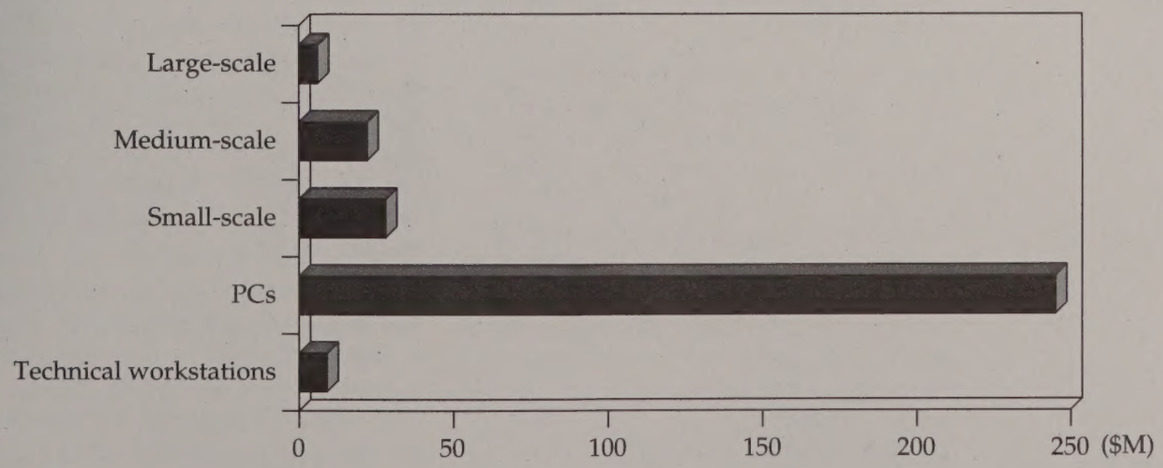
The Hungarian workstation market demonstrated solid growth in 1993, with unit shipments increasing almost 40% over the previous year. The most important market sector continues to be educational institutes and scientific research and development organizations, which utilize Unix-based workstations for computer-aided engineering (CAE), computer-aided design (CAD), and other developmental purposes.

Presently over 150 Hungarian organizations, from leading local computer vendors to newly formed small-scale enterprises, export software and professional services to 29 countries worldwide. There were more than 22,800 software and services professionals in the market by 1991, 32% of whom were either involved in the development of software for export or worked directly for a foreign company. Many Hungarian software organizations have highly skilled systems software and software tool design staffs.

Poland

Poland's IT hardware market spending reached $310 million in 1993, with personal computers accounting for 75% of that amount. Spending among the other four size classes paled by comparison, with small-scale systems achieving the second highest revenue figure. Poland's hardware market will continue to develop rapidly in the years ahead, with a projected growth rate of just under 14% through 1995 in terms of both unit and value shipments. Although high growth rates exist for high-end mainframe equipment, most shipment activity will take place at the low end of the market, particularly for small-scale systems (proprietary systems, Unix-based machines, network servers, and client/server technology), personal computers, and data communications hardware.

Value of 1993 IT Hardware Shipments in Poland, $M



Total = $310M

Source: International Data Corporation, 1994

In 1993, sales of personal computers continued to surge in what has become East Central Europe's largest PC market. Shipments increased 15% to $245 million. Despite significant inroads by name-brand vendors, local assembly operations continued to control the dynamics of the PC market. The country's four leading clone PC vendors — Optimus, Protech, JTT and Hector — supplied approximately 40% of the systems shipped. The Polish PC market will continue to exhibit substantial annual growth over the next several years.

The ongoing computerization of banking, financial services, and government administration continued to drive growth in Poland's multiuser market in 1993. The market reached an estimated $56 million. The vast majority of shipments lay in the small-scale systems sector, reflecting an ongoing downsizing trend seen across East Central Europe.

The Polish workstation market is oriented largely to the technical end user employing CAD and scientific research applications, albeit with a growing number of commercial installations. It is anticipated that Poland will have the fastest-growing Unix-based technical workstation market in the Eastern European region through 1997, with a projected annual growth rate in shipments of more than 84% over the five-year forecast period.

Unlike other countries in the region, the Polish government has taken a proactive role in developing a long-term IT strategy for the public sector, as well as in setting more general computerization goals for the national economy. The ongoing restructuring of the public-sector administration will spur demand for all types of IT equipment. A number of state agencies are still not sufficiently equipped with IT equipment and constitute a potentially large market. However, the country's fast-growing private sector, now numbering over 61,000 new companies, will serve as the primary source of IT market growth in the years ahead, particularly in smaller companies.

Western vendors control the greater part of the official software and services market. Although the gray market for software products is diminishing, software piracy is still rampant. In response to recurring complaints, legislation has been introduced to give the country a copyright law that encompasses protection of computer software.

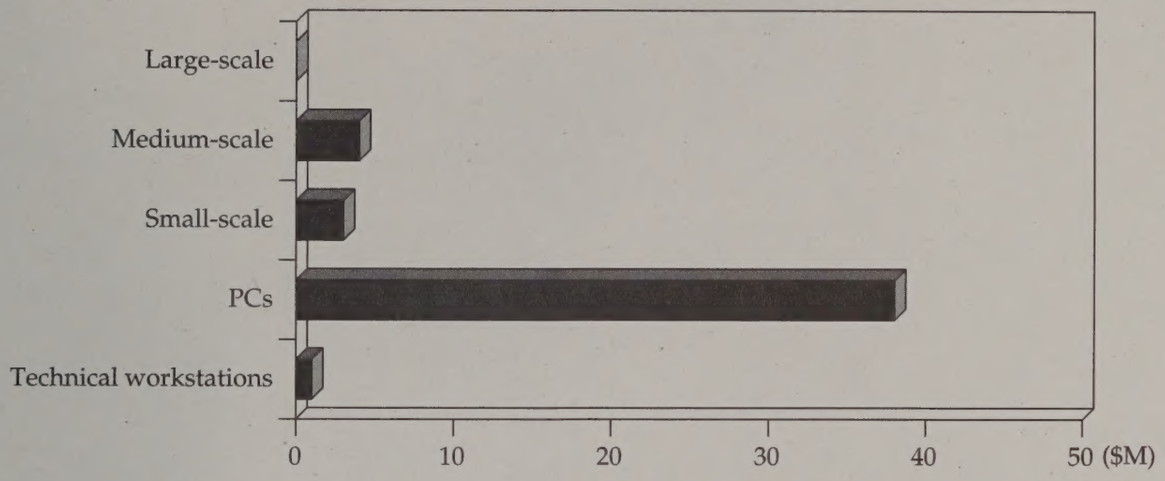
Romania

Computer hardware shipments in Romania totaled an estimated $45 million in 1993. PC sales accounted for more than 90% of this total. Local assemblers continue to supply the majority of new systems; however, name-brand vendors are garnering an increasingly larger share of the market. IBM, Compaq, Apple, and Hewlett-Packard are now well represented in the Romanian PC market, particularly in the more solvent sectors of banking and government administration.

The multiuser systems market in Romania is relatively small compared to other countries of the region due to limited funding and the popularity of LANs and PC servers. The total value of this hardware class reached an estimated $5 million in 1993 and is projected to grow marginally through 1995. Most multiuser shipment activity is concentrated in the RISC-based server and workstation server markets within the banking and government sectors. IBM is the only vendor recording notable sales of proprietary equipment such as the AS/400.

The local preference for servers has facilitated growth in the workstation market. IBM, Silicon Graphics, Digital Equipment, and Sun Microsystems have all seen a sharp increase in the demand for workstations and workstation servers, which in total comprise fewer than 200 unit shipments annually.

Value of 1993 IT Hardware Shipments in Romania, $M



Total = $46M

Source: International Data Corporation, 1994

Despite economic uncertainty, there is considerable pent-up demand for information technology in the Romanian market. IT penetration rates are low in comparison to other countries of the region, and the installed base of multiuser systems and office equipment is small relative to the size of the population, The country's IT hardware market is projected to grow at an annual rate of 15% through 1995.

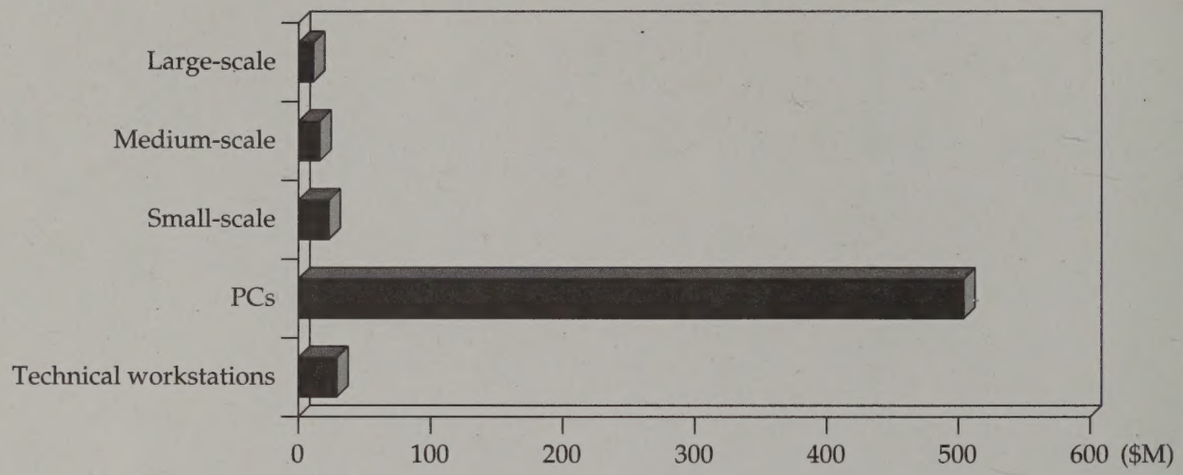
Russia

Russia is confronted by an interrelated set of severe economic problems including a declining GDP, burgeoning inflation, unstable currencies, rising unemployment, and growing foreign debt. Despite this turmoil, the Russian market embodies one of the largest single opportunities for IT market development in the world today. Indeed, the sheer size of the total market and the dearth of computing technology will drive substantial market growth through the year 2000. Several international IT vendors already have seen substantial revenue increases from the Russian marketplace in the 1993–1994 period.

The value of all computer hardware shipments in Russia reached an estimated $583 million in 1993. Similar to the countries of Eastern Europe, the Russian market will be overwhelmingly oriented to personal computers and related technologies in its initial stages of computerization. A combination of burgeoning growth in the private sector and widespread downsizing in most vertical markets will boost the PC market to $504 million, the largest in the region. In the short term, the most important sectors for IT market growth are financial services, government administration, basic infrastructure (energy and transportation), social security systems, and manufacturing.

The region's evolving banking industry is clearly the most lucrative sector in the short term. With significant hard-currency profits, banks are the only organizations that are procuring more expensive, sophisticated hardware and software solutions. The vast majority of banks are undercomputerized, with IT infrastructures generally limited to a few personal computers and corresponding software.

Value of 1993 IT Hardware Shipments in Russia, $M



Total = $583M

Source: International Data Corporation, 1994

The opening of the Russian market in 1991–92 quickly transformed the local PC market from one dominated by a state-run manufacturer of outdated technology to a market served by assembly operations importing Far East components and limited imports from international vendors. In the Moscow area alone, more than 40 major PC assemblers have emerged. Local assemblers will continue to control the dynamics of this evolving market, which is projected to exceed 500,000 units by 1994. International vendors such as IBM, Compaq, and Dell will figure prominently in the brand-name arena.

Russia presides over a substantial installed base of multiuser systems, including IBM- and Digital-compatible systems, offering IT vendors significant opportunities for replacement and upgrade sales. The value of the multiuser market reached $50 million in 1993, with the highest growth coming from the small-scale class.

Technical workstations and applications such as CAD have been broadly familiar to the computer industry and IT community in the former Soviet Union since the 1970s. The preference for this technology has led to a large market for international vendors, especially Sun Microsystems. Estimates place the 1993 workstation/workstation server market value at $29 million.

IT distribution channels in Russia pose a distinct challenge to vendors as economic, political, and practical concerns (for example, communications and transportation) continue to make these markets difficult in terms of simple distribution logistics. Traditional channels are also threatened by private firms initiating their own assembly operations and sourcing IT hardware through the gray and black markets.

The software and services market in Russia is largely local. The limited penetration by outside firms is a reflection of the extensive black market for pirated software and the large pool of local programmers, but, of all the CIS states, the Russian Republic has taken the most serious steps to combat software piracy. In terms of

future development, the large number of local software specialists will facilitate strong demand for application-development tools, particularly relational database management systems (RDBMS).

Slovenia

Known as the Switzerland of Central Europe, Slovenia stands out among the countries of the region because of its relatively smooth transition to a market economy, its high per-capita income, and the maturity of its IT market. Avoiding the neighboring turmoil, the Slovenian government has managed to turn the economy around rather quickly, with positive growth anticipated in 1994 and 1995.

Slovenia traditionally presided over the most developed computer market of the former Yugoslavia with a relatively large number of mainframes, minicomputers, and corresponding networks. According to official statistics, it fielded roughly 40% of the former country's installed base prior to the onset of hostilities in 1991. The current installed base of personal computers is estimated at 140,000 units.

Given a population of only 2 million inhabitants, the Slovenian market is one of the smallest IT hardware markets in the region. The total value of computer hardware imports reached only an estimated $140 million in 1993. However, in terms of per-capita expenditures, Slovenians spent more than twice their Hungarian counterparts.

Similar to other countries of the region, the value of Slovenia's computer market is derived largely from the sale of personal computers and related technologies. There is, however, a much higher percentage of name-brand systems shipments at this juncture of Slovenia's IT market development compared to other countries in the region at a comparable stage. The two most successful international vendors are IBM and Compaq.

Current IT vendor activity is focused on meeting the needs of the evolving private sector, as well as the requirements for developing the computer infrastructure of both the banking and government sectors. Vendors are also targeting the replacement market because a large proportion of the country's installed base of computer hardware comprises multiuser systems over eight years old.

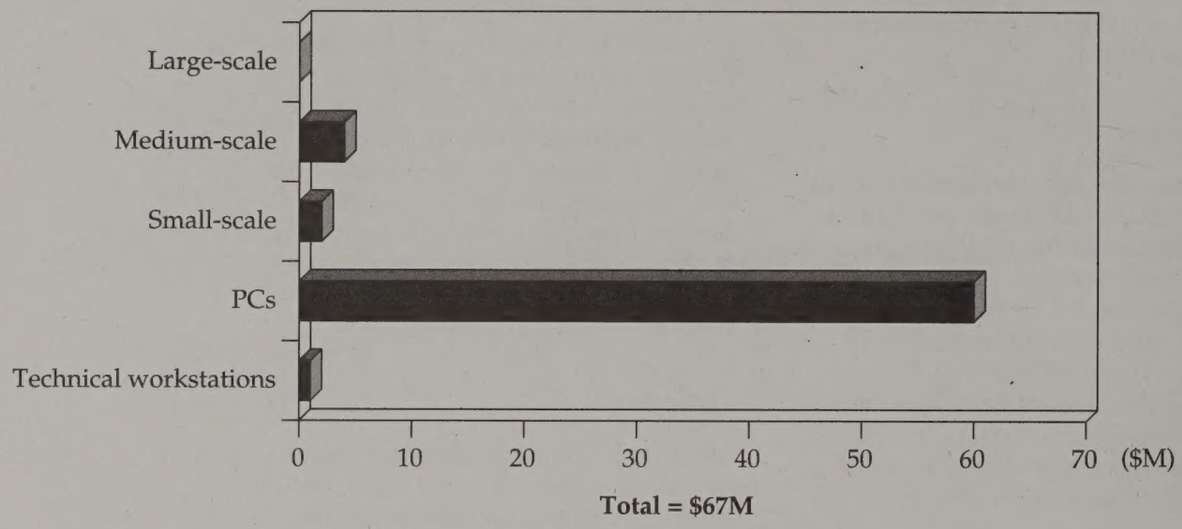
Ukraine

Ukraine is the second largest economy of the former Soviet Union, but it is struggling to move forward. The country's GDP declined 15% in 1993 and is projected to fall another 10% in 1994. With an economy heavily dependent upon trade and energy resources from other former Soviet Republics, Ukrainian industry has been particularly hard hit by the loss of the Russian market as an export market and a supply source.

The Ukrainian IT marketplace offers a challenging environment for equipment vendors. The absence of a functioning commercial banking system and skyrocketing inflation have exacerbated problems with such basic tasks as payments and money transfers. Moreover, the government has introduced a complex maze of licensing requirements, import and export quotas, independent customs duties, and import and tax regulations, all of which have led to a sharp increase in market prices.

Nonetheless, the country's economic and political difficulties should not dissuade IT vendors from taking up operations in this market. With 52 million inhabitants, the Ukrainian market embodies significant high-growth potential over the long term.

Value of 1993 IT Hardware Shipments in Ukraine, $M



Total = $67M

Source: International Data Corporation, 1994

In 1993, computer hardware shipments reached $66 million, which represents only 20% of the corresponding value of the Polish market. Much of the current market value is derived from personal computer sales, and these are estimated to be 50,000 units annually, comprising mainly no-name, Far East-based products.

As one of the more developed IT markets of the former Soviet Union, Ukraine also presides over a substantial installed base of multiuser systems. The estimated 7,270 IBM- and Digital-compatible systems in operation offer IT vendors significant opportunities for replacement and upgrade sales.

Much of the current IT vendor activity is limited to select vertical markets such as banking, government administration, and scientific institutes.

THE GRAY SHEET
Computer Industry REPORT

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In Search of New Market Opportunities: Think Small

IDC's *1994 Global IT Survey*: Small Businesses

Vendors serving the information technology market's largest customers are firmly entrenched, and in a time when growth of big businesses is stagnating, new market opportunities may seem to be limited. In response, IT vendors are turning to the fast-growing, undercomputerized small-business sector in search of untapped demand. A stable economic expansion and the downsizing of monolithic corporations is supporting the emergence of a wide base of smaller businesses.

According to the Small Business Administration, business establishments with fewer than 100 employees account for over 85% of total U.S. establishments, and new businesses are expanding over 5% per year. Meanwhile, not only is information technology investment becoming necessary for smaller companies to compete in today's market, but also it provides a tool that can be used to target global markets more easily than in the past. In turn, the expansion of the small-business sector is expected to continue to provide a significant source of growing IT demand.

In order to clarify and define the characteristics of this marketplace, IDC expanded its *1994 Global IT Survey* to include and differentiate responses from small businesses on a worldwide basis. Small businesses are defined in this study as sites (including both independent businesses and corporate satellites) with fewer than 100 employees. The primary objectives for this year's survey were the following:

- To better understand the 1994 customer environment in terms of current priorities, overall attitudes toward IT change, and the influences on IT decision-making
- To establish current and future usage patterns for key products such as personal computers, LANs, software, and emerging technologies
- To estimate actual 1993 and anticipated 1994 IT spending levels and to determine allocation of this spending across internal and external resources

In short, this project is designed to present a comprehensive view of IT plans, attitudes, and concerns. IDC simultaneously conducted nearly identical research in the United States, the United Kingdom, Germany, France, Italy, Sweden, the Benelux countries, and Japan. For the small-business portion of the survey, an average of 750 businesses were interviewed in each country (520 in Sweden, 970 in Japan), and global results were produced from nearly 6,000 sites.

September 30, 1994 Vol. 29, No. 22

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Some of the highlights of this year's survey of small businesses include the following:

- Despite their relatively limited financial resources available to hire additional employees, small businesses spend the same percentage of their IT expenditures on in-house computer staff as do large and medium businesses.
- Existing small businesses in the United Kingdom and Sweden currently have the most aggressive plans to expand their IT spending relative to the companies in the remaining surveyed countries.
- Although small businesses are predominantly the domain of personal computers, approximately one-third of all worldwide sites also make use of minicomputers and mainframes.
- Only 40% of all sites worldwide rely primarily on packaged software for their application needs, while others opt to emphasize custom applications whether developed on their own or acquired from outside contractors. The percentage of packaged software enthusiasts climbs above 50% only in the United States and Germany, and reaches a low of 17% in Japan. Heavy reliance on contractors in both Italy and Benelux brings the percentage of overall European sites relying primarily on packaged applications down to 38%.
- Across all surveyed regions, small-business demand for services is focused primarily on hardware maintenance, training and education, and installation and support. However, service demand is lukewarm at best, rating even the highest use of a specific service under 3 on a scale of 1 to 5.

This issue of *The Gray Sheet* will examine more closely the survey's results on the overall purchasing strategies of small businesses and their anticipated usage plans for hardware, software, and new technologies.

Small-Business IT Spending

Although small businesses spend less in total on information technology than larger firms, the substantial size and growth of the base of small-business establishments as a whole offers significant market opportunities for IT vendors. These customers are confined by smaller budgets, but are increasingly finding it necessary to invest in IT, particularly to automate their offices and raise the productivity level of their general commercial processing and online transaction processing activities.

Of the small businesses that are investing in IT, the majority are clearly dedicated to developing a significant strategic business role for their information systems. Nearly 55% of total worldwide small-business IT spending is dedicated to in-house computer personnel, and the remainder is spent externally on either the products or services of IT vendors.

According to IDC's survey, a solid commitment to internal spending exists in the United States and in Japan (where support for in-house staff has always been strong), but is highest in France where more than 70% of IT expenditures is spent on internal resources. In contrast, small businesses in Germany, the United Kingdom, Italy, Benelux, and Sweden rely more heavily on external resources.

Hardware expenditures account for the highest proportion of small-business external spending worldwide at 44%. Yet, compared to larger businesses, small businesses tend to shift IT investment funds away from hardware products and toward services expenditures, including maintenance. Meanwhile, the software portion of small-business IT spending holds steady at the same level as larger businesses at 22%.

When you're responsible for understanding the intricacies of the global computer industry's maturation and growth IDC's ***Computer Industry Report*** *is the most reliable source of information and analysis you can find.*

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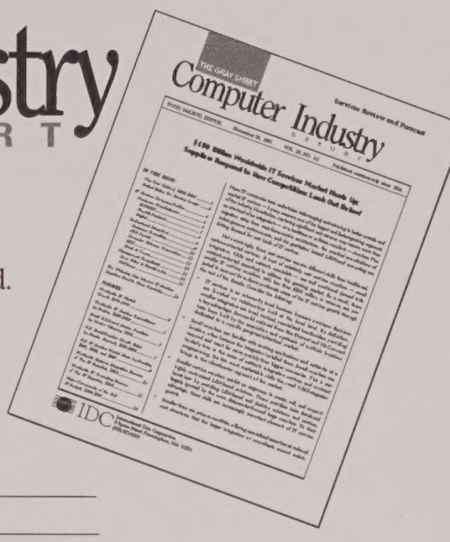

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Country Variations

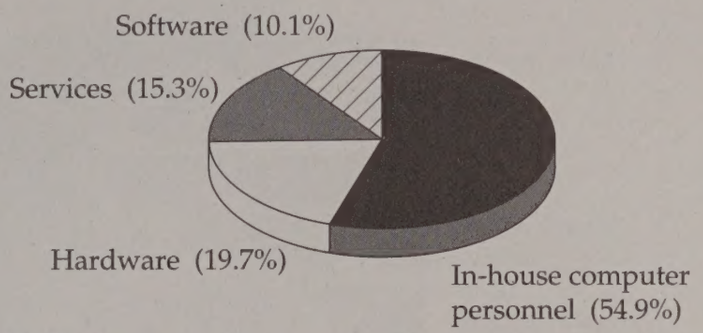
Economic and cultural differences have set varying degrees of small-business IT adoption rates across countries, leaving existing sites at disparate stages in their current level of investment. The countries included in this year's survey can be divided into three groups based on the anticipated IT spending growth of their small businesses:

- As the business environment improves and willingness to accept new technology runs high, the surveyed sites in the United Kingdom and Sweden are most optimistic about increasing their IT spending budgets in 1994 (7% and 9%, respectively, anticipated growth).
- In Japan, where the economic recovery has been tentative, and Benelux, where IT adoption rates have lagged those of other developed countries, small-business IT purchasers are expected to remain hesitant to move forward and will maintain current levels of expenditures.
- In the United States, Germany, France, and Italy, IT adoption rates have been relatively swift, and small businesses tend to establish a computing infrastructure in the early stages of their development. As a result, IT spending of the existing businesses within these countries is expected to be trimmed slightly.

However, it is important to remember that rising small-business IT demand derives primarily from the establishment of new businesses rather than accelerating demand from existing customers. Despite the significant risk of failure, newly created businesses invest in IT most heavily during the early stages of their development. In areas where economic conditions are improving, entrepreneurial activity should remain high, creating additional new market opportunities for IT vendors. In order to realize the market's highest revenue growth potential, vendors must center their sales strategy around targeting new customers rather than maintaining and building existing accounts.

Small-business sites worldwide dedicate an average of 18% of their external IT spending to personal computers, but the relative importance of PC hardware expenditures within IT budgets varies widely among the countries surveyed. U.S. small businesses use nearly one-third of their external IT expenditures to invest in PCs, leading all nations in their commitment to developing a solid PC computing base. Sweden and Germany follow right behind, suggesting that those cultures that are most supportive of IT innovation are forging ahead with plans to develop their IT hardware infrastructure based on advanced PC systems.

Worldwide Small-Business IT Spending by Budget Category



N = 4,551 sites

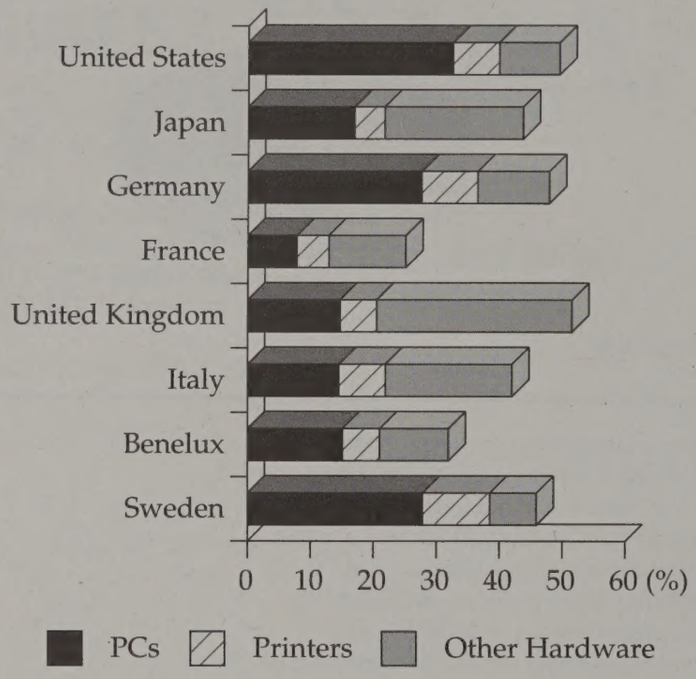
Source: IDC's 1994 Global IT Survey

In France, just 8% of small-business external IT spending is targeted for PC equipment, and only one-quarter is set aside for all types of hardware. Instead, French businesses are inclined to rely more heavily on IT services directly from a vendor, spending over half of their total external IT budgets on all services and 30% on maintenance activities alone (vs. 20% worldwide).

Reliance on services is also strong in Japan and the Benelux nations. Demand in Benelux is weighted toward professional services, suggesting that the pace of IT adoption may quicken in coming years as consulting advice favors additional IT hardware investments. According to IDC's survey results, the most significant increases in small-business services demand will take place in the United Kingdom, Italy, and Sweden, where more than 20% of surveyed sites expect to increase their services expenditures.

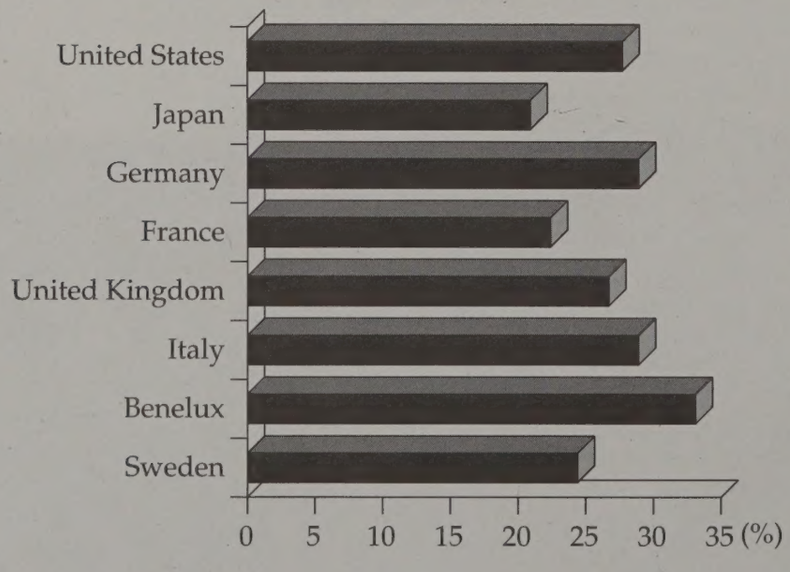
Spending on software as a percentage of total external IT purchases remains fairly stable across all countries, posting an average of 22%. On the high end, one-third of total Benelux external IT budgets is spent on software. In contrast, the

Small-Business IT Hardware Spending:
Percent of Total External IT Spending



N = Total of 4,551 sites. High 781 (Japan), low 343 (Sweden).
Source: IDC's 1994 Global IT Survey

Small-Business Software Spending:
Percent of Total External IT Spending



N = Total of 4,551 sites. High 781 (Japan), low 343 (Sweden).
Source: IDC's 1994 Global IT Survey

reliance on packaged software is lowest in Japan (21%) and France (22%), where in-house software application development is most prevalent. Anticipated increases in software spending among existing small businesses is highest in the United Kingdom and Sweden.

Influence on IT Decision Making

Internal Decision Makers

Despite devoting 55% of total IT expenditures to in-house computer personnel, small businesses offer far less autonomy to IT specialists than do larger businesses. In contrast to the big-business culture, which tends to define clear roles for IT personnel and to distribute decision-making power, the culture of small businesses still places most investment decisions in the hands of the owner or central management. As a result, IT specialists take a back seat to centralized decision makers even on matters of IT development plans.

Whereas computing strategies at three-quarters of all large and medium businesses are set by IS specialists, over half of the small businesses surveyed worldwide stated that the owner, a general business manager, or a finance manager is more likely to set their IT spending plans. Fewer than 30% stated that their data processing manager or IS specialist held this responsibility. Since the planners for small-business IT strategies tend to be more focused on financial matters, IT vendors can expect to face purchasers who are more interested in the necessity and cost effectiveness of technology rather than its enabling features.

The primary internal decision makers for IT investment varies across countries. Business owners in the United States, the United Kingdom, and Benelux are most likely to retain control of IT purchasing decisions, and in Italy the finance manager takes on this role. However, IT specialists in France and Sweden have broken through the centralized management structure of small businesses, raising the status of data processing managers above other role players when computing decisions are made.

External Influencers

Direct contact with large businesses has been an effective means by which IT vendors could gain market recognition and sales. According to survey respondents worldwide, direct communications from computer-system vendors are also the most important factor influencing IT purchasing decisions at small businesses. In addition, an informal network of colleagues ranked as having the greatest influence on computing strategies worldwide. However, the sheer magnitude of the base of small-business sites somewhat limits the viability of directly approaching solitary small businesses.

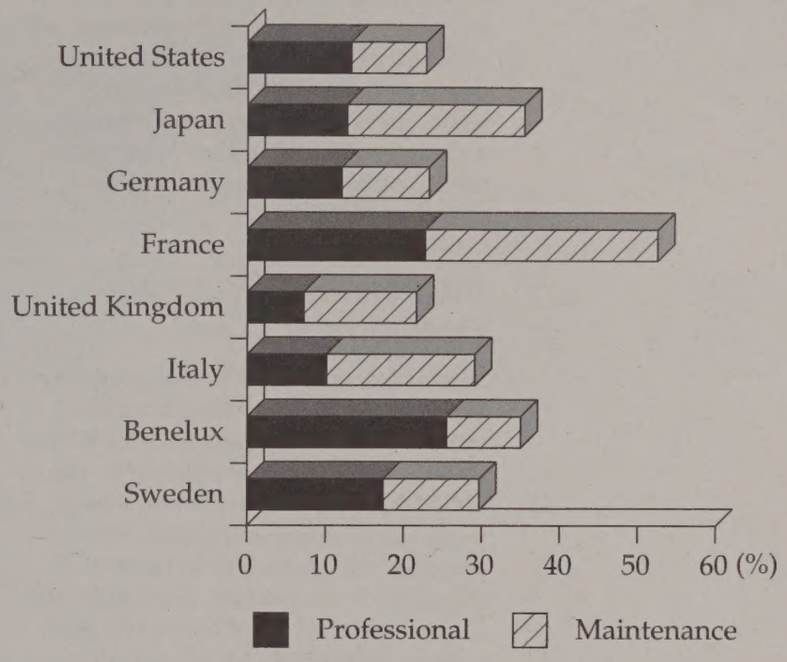
Successful targeting of demand in this market requires an understanding of the factors that influence the decisions of IT purchasers in each country. For instance, IDC's *1994 Global IT Survey* reveals that small-business decision makers in the United States rely mainly on the advice of their colleagues and computer/software consultants, while Japanese investors look toward computer-system vendors and the trade press for information. Elsewhere, computer consultants and the trade press rank high in Germany, value added resellers gain relatively strong influence in the United Kingdom, and computer services firms are highly touted in Italy.

Minicomputer and Mainframe Usage

Small-business computing environments may be assumed to be overwhelmingly PC oriented, but use of minicomputers and off-site mainframes should not be overlooked. Mission-critical computing requirements may lead small businesses toward a variety of hardware solutions.

More than one-third of small businesses surveyed worldwide use minicomputers, with their strongest presence in France and Sweden. French purchasers have been biased by the high presence of traditional minicomputer and mainframe-centered environments in larger businesses and have been reluctant to establish new architectures. Yet the European-wide push toward distributed computing and client/server architectures is expected to gain momentum in both of these countries.

Small-Business IT Services Spending:
Percent of Total External IT Spending



N = Total of 4,551 sites. High 781 (Japan), low 343 (Sweden).
Source: IDC's 1994 Global IT Survey

The lowest current small-business minicomputer usage is recorded in the United States and Germany. The availability and wide acceptance of advanced PC-computing solutions, along with their competitive pricing, have made PCs a more attractive alternative in these two countries. However, lower-priced new minicomputer product offerings have the potential to gain share of the small-business IT market. Expectations for future minicomputer use are now strongest in the United States and Italy, where a majority of survey respondents anticipate increasing their future purchases. The weakest expectations for future use are in Benelux.

Minicomputer purchasing channels are slanted toward direct manufacturer sales in both France and Germany, but elsewhere in the surveyed region small businesses split their purchasing source between manufacturers and system resellers.

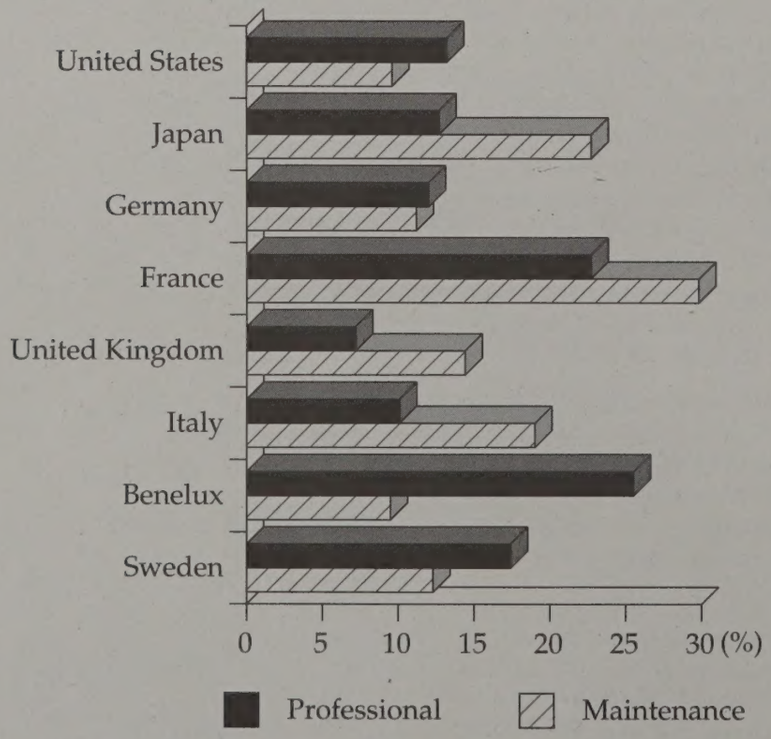
Although the downsizing phenomenon has reduced the market potential for mainframes, small-business use in the United States and Japan still stood at the significant levels of 34% and 45%, respectively, in 1993. In contrast, mainframe use was far lower in Europe (with the exception of the United Kingdom).

However, as critical price points are reached by mainframe dealers, some interest in the market will return. Over 40% of French respondents anticipate an increase in future use of mainframes, and over half of Japanese and Italian respondents gave the same response. Once again, users in Benelux have practically no plans to expand usage of larger systems, leaving only minimal market opportunities there.

The Personal Computer Environment

Worldwide small-business IT usage, as expected, is overwhelmingly centered around personal computers, with 40% of all sites connecting them to LANs. The adoption of PC-oriented environments is particularly strong in Sweden, where respondents reported an average of 21 PCs were in use per site. Users in Japan, France, and the United States followed with approximately 14 PCs per site — and they still have the most aggressive plans to expand their base.

Minicomputer and Mainframe Use in Small Businesses: Percent of Small-Business Respondents Using Denoted Hardware



N = Total of 6,062 sites for minicomputers; 6,054 sites for mainframes. High 970 (Japan), low 523 (Sweden).

Source: IDC's 1994 Global IT Survey

The existing small businesses in these three countries expect to add at least another three PCs in 1994, with Japanese purchasers speeding ahead with plans to purchase nearly seven PCs per site. It is important to note, however, that survey sites in Japan tended to be larger than those in other countries. Meanwhile, all European customers anticipate reducing their number of PC purchases to an average of just over one.

Except in Japan, where NEC and Fujitsu PCs hold significant market share, IBM or compatibles account for over half of currently installed end-user devices (including workstations and terminals as well as PCs) in small businesses worldwide. The strongest share for IBM compatibles, not surprisingly, is in the United States, but significant share is also held in Germany and Sweden, where the standalone computing power of the PC is often utilized. Elsewhere in Europe, IBM compatibles give ground to a higher use of terminals as the favored end-user device.

PC Vendor Choice

Cost effectiveness and savings tend to drive the psyches of small-business managers. As a result, quality and price rank as the most important criteria for PC purchases worldwide. Nearly half of all respondents in each country stated that these factors were their primary concern, with the exception of Italy, where quality and service rank as the top purchasing criteria, and Japan, where price and availability are the most significant factors. The relative importance of product availability in Japan suggests that the nation's distribution channels still need to be developed substantially to meet rising demand.

Vendor service and support ranked as secondary criteria for PC purchases worldwide, while fewer than 10% indicated that leading-edge technology was the most compelling reason for choosing their PC vendor. The push into next-generation technology may be valued highly by larger businesses, but small businesses will be content to find the most cost-effective solution for their limited computing needs. The relative importance of price in the minds of small-business consumers confirms that vendor market share will largely be determined by how successfully pricing dynamics are handled.

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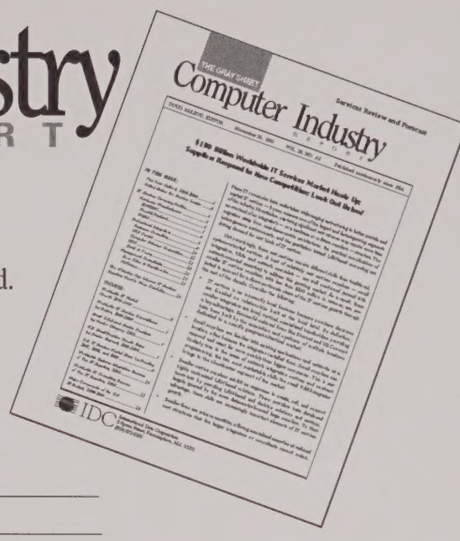

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IBM, Apple, and Compaq ranked as the survey respondents' favored PC manufacturers for last year's purchases and remained the anticipated vendors of choice in 1994. However, nearly 40% of all respondents indicated that they did not know which PC manufacturer they would choose in 1994, indicating a relatively low degree of brand loyalty, and a high proportion of customers who intend to wait until late in the purchasing process to determine which vendors will offer the desired qualities. Compaq has proven to be the most successful in meeting these customer needs in 1994.

Favored Purchasing Channels

Customers' criteria for choosing purchasing channels varies far more than the qualities they seek in manufacturers. Specialty computer stores have become the primary channel in the United States and a strong choice in Germany as well. But throughout Europe, the favored purchasing channel is through resellers that have developed an expertise in a specific application. In contrast, Japanese small-business users still prefer to buy products from dealers or visiting salespersons.

The use of direct purchasing channels — via telephone or mail order — has grown in popularity in the United States, the United Kingdom, and Sweden. U.S. purchasers anticipate greater use of this channel; however, European customers seem to be shifting back toward resellers as their primary purchasing point. According to survey responses, PC-channel choice will remain largely based on price, support, and service, with less emphasis placed on speed of delivery.

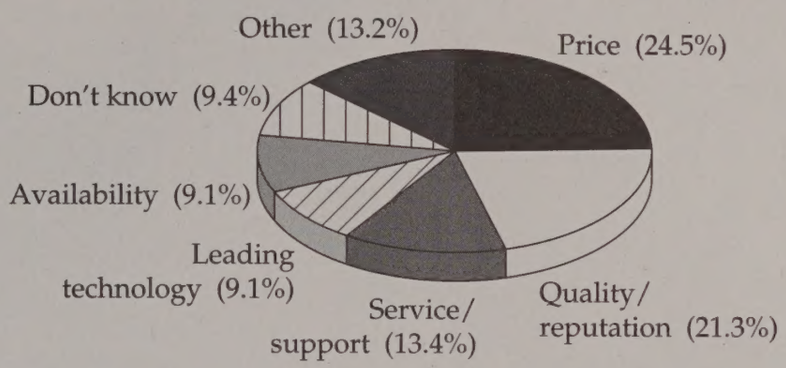
A Customized Approach to Application Software

Small businesses may rely more heavily on the packaged software market for application solutions compared to larger businesses, but still only 40% of these businesses worldwide choose to purchase packaged applications rather than develop their own. The countries surveyed in this year's study can be divided into three groups in terms of their primary approach to acquiring and developing software applications:

- Those that mainly purchase packaged software and do not develop their own applications — the United States and Germany (where the majority of businesses choose this option) as well as the United Kingdom and Sweden
- Those that develop their own applications using traditional programming languages — Japan and France
- Those that primarily use outside contractors to develop customized software — Italy and Benelux

Primary PC software purchasing channels largely reflect the types of channels chosen for PC hardware: U.S. users tend to buy directly from vendors or computer specialty stores, Western European buyers choose resellers, and Japanese buyers usually purchase software from a visiting salesperson or a dealer. Since

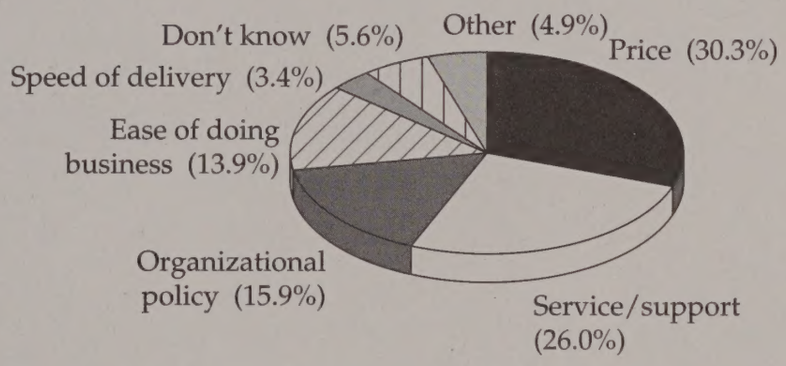
Main Reason for 1994 PC Vendor Choice: Percent of Worldwide Respondents



N = 2,838 sites

Source: IDC's 1994 Global IT Survey

Main Reason for PC Purchase-Channel Choice in 1994: Percent of Worldwide Respondents



N = 3,072 sites

Source: IDC's 1994 Global IT Survey

Japanese buyers are inclined to develop their own software, the development of direct vendor relations will likely remain the most effective distribution channel for vendors looking to expand sales in the Japanese market.

Although software purchasing-channel choices are similar to those for PCs, the ranking of channel criteria shifts slightly to place the greatest emphasis on service and support, followed by price. Once again, speed of delivery falls lowest on the stated list of considerations.

Technology Implementation

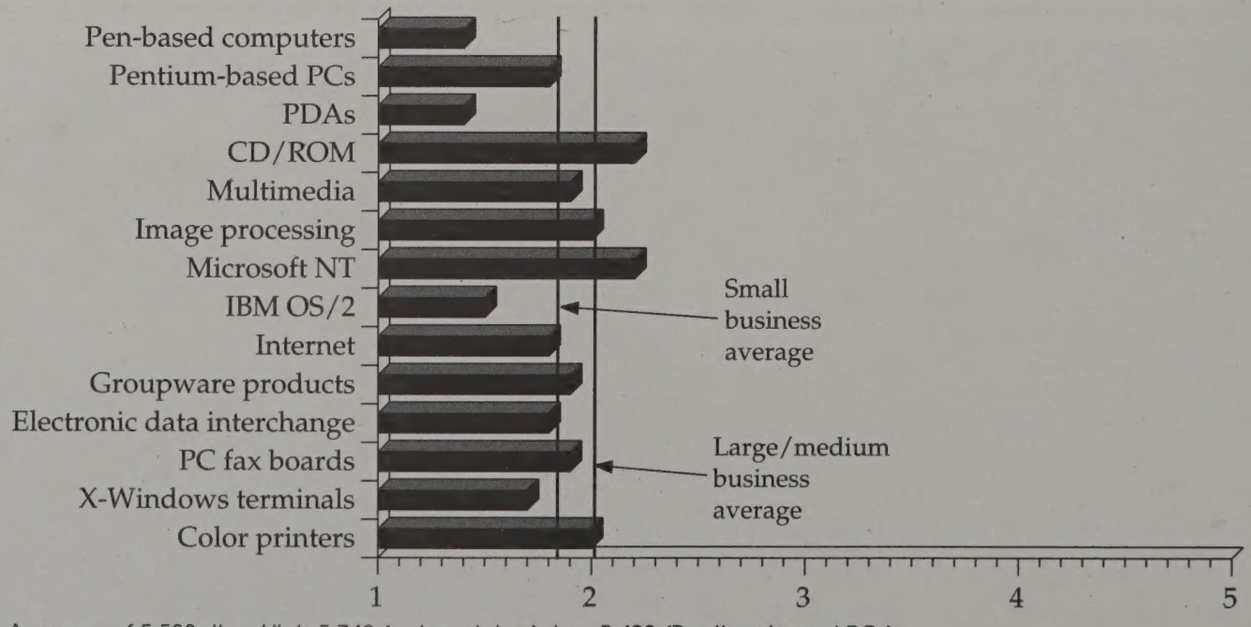
Smaller businesses are more conservative than larger ones when making IT spending decisions, emphasizing their basic computing needs at the most cost-effective price. In turn, it is not surprising that they are less likely to accept new technologies and instead wait to examine the results from the test grounds of larger businesses. However, the responses from small businesses in this year's survey suggest that modems, CD/ROMs, and Microsoft Windows NT are moving into mainstream use. Meanwhile, skepticism prevails over pen-based computers, PDAs, and IBM OS/2. Yet, despite this dichotomy, none of these new technologies stick out as pure winners or losers among small businesses.

On a regional basis, Benelux, Germany, and the United Kingdom display the greatest reluctance to adopt new technologies. Meanwhile, responses from Japanese small businesses support the results of the large and medium-sized business survey, which suggested an attitudinal shift toward the acceptance of new technology. However, although attitudes may change, purchasing capabilities may not. Since small businesses in Japan have noted that price and availability are their two main purchasing criteria, the inhibiting costs of the latest technology or the absence of well-developed distribution channels for small businesses will most likely limit market opportunities for now.

In the long run, a growing number of product offerings, lower prices, and more channel options will attract rising demand from the growing base of small businesses. In order to penetrate this market, vendors need to develop more accessible channels for customers in countries outside the United States, investigate critical price points for their products, and tap into the demand for installation and other services to create market opportunities for both hardware and software.

For more information on IDC's 1994 Global IT Survey, *please contact Linda Rich at (508) 935-4389.*

Worldwide Small Business New-Technology Acceptance Index, 1994



N = Average of 5,583 sites. High 5,742 (color printers), low 5,402 (Pentium-based PCs).

Source: IDC's 1994 Global IT Survey

THE GRAY SHEET
Computer Industry REPORT

Published continuously since 1964.

So What if There's Hype?
The I-Way Is No Byway, but the Road to the Future

A promise made almost two decades ago is finally about to be kept. On September 22, 1977, in the first issue of *The Gray Sheet* to be devoted exclusively to the personal computer, we opined:

The introduction of sub-$600 computer systems... has suddenly made personal computers attractive as a home utility, and as a source of entertainment...This user segment has tremendous market potential if/when... the devices can be utilized as interactive receiving sets.... Indeed, the brightest prospect for the home computer lies in its use as an information appliance (for on-line access to outside resource material and data bases); and because this utilization will require telephone linkups, it is likely that AT&T will direct some attention to this market.

The vision of the information appliance was not fulfilled. Despite the name, the PC did not turn out to be very personal, at least in the sense of a home utility; instead, after its embrace by IBM, it reconfigured the workplace. And for long years, PC MIPS were not powerful enough, interfaces were not adequately intuitive, applications were not attractive enough, and data communications were not sufficiently inexpensive and efficient for interactive computing.

The Third and Fourth Stages

Much has changed, especially over the past five years. The chips powering PCs grew in power to encompass the potential for multimedia applications. Meanwhile the center of computing became no longer a single computer, whether PC or host with terminals, but a network of intelligent peers to which the corporate or departmental system is server and servant. The growing importance of data communications was recognized in U.S. government funding for the ARPANET, which became the Internet, and in plans for new projects such as the U.S. National Information Infrastructure Testbed, largely funded now by industry sources with the end of the Cold War.

A second side of the revolution was developing from another direction, as music and other forms of entertainment were being digitized. The compact disc and digital tape augured a future of digital media convergence — of true multimedia — available in the same digitized form as computer commands.

October 28, 1994 Vol. 29, No. 23

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Meanwhile a critical facilitator was taking shape within the communications sector. Starting with the breakup of the old AT&T in the United States and the sanctioning of competition to British Telecom in the United Kingdom, a global trend toward the privatization of telecommunications carriers inaugurated a new era of almost entrepreneurial innovation and competition in what had been hibernating monopolies.

But even without these factors, something like the current discussions about the information highway, or superhighway, or Infobahn, or, as we prefer, the I-Way, would have occurred anyway. For, even after stripping away the hype generated by vendors eager to fund long-term investments with short-term, publicity-driven expenditures, the I-Way is something both simple and grand: *the next stage in the evolution of the information technology industry.*

The first stage centered around proprietary minicomputers and mainframes, focused on institutions, and involved a limited (although large) number of information workers — around 10 million worldwide. It peaked in the early 1980s and has since fallen into a gradual decline; terminal connections, the connectivity paradigm of the first stage, should dwindle to inconsequence in about a decade and a half.

We are currently at the apex of the second stage, centered on individuals, nearly 100 million of them, whether in the workplace, especially white-collar and professional activities, or in schools, or, increasingly, in the home. The technological center has been the personal computer or workstation, whether standalone or in a local area network, but more broadly it has encompassed the entire open systems revolution, which helped shift the economic center of the industry from the hardware manufacturer to the software purchaser.

The client/server mantra of the past half decade is not an alternative to this individualistic second phase, but its natural expression. In about a third of a century, the concept will have become meaningless, for advances in technology will have transcended the paradigm of localistic networks yoking limited numbers of professionals. Instead, everyone would be "wired."

The I-Way should be seen as the next great wave of industry expansion, where the defining aspect will be the pervasive connectivity of both business and consumers. Its beginnings can be placed within the past year and a half, not because of speeches by Vice President Al Gore or white papers issued from the office of Jacques Delors, the former president of the European Union, but due to the explosion in connections to the Internet, the first major manifestation of this trend toward universal interconnection.

Nor will evolution cease at this stage. Beyond the I-Way will be the information society, which will be defined by the arrival of truly all-digital multimedia content. We believe that the transition to this fourth stage will be as significant as to the earlier sequences. The difference will be equivalent to the jump from client/server to "wired."

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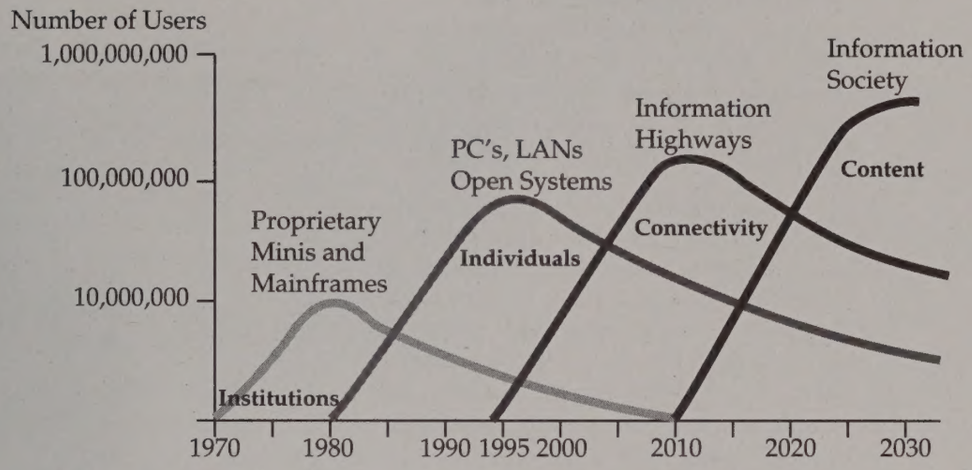
Volume 29, Number 23

IT Industry Evolution, 1970–2030



Source: International Data Corporation, 1994

"Wired"

Nineteenth-century utopian novels like Edward Bellamy's *Looking Backward 2000–1887* are sometimes credited with forecasting future inventions like the radio and television. To many contemporary readers, they promised a clean, orderly, integrated existence without the sharp discontinuities of Gilded Age life. For others, they came to symbolize a soulless technocratic future satirized in a series of anti-utopian novels best symbolized by Aldous Huxley's *Brave New World.*

Investigated more closely, Bellamy's "radio" and "television" are simply extrapolations of nineteenth-century everyday technology — the telegraphs and telephones connected to central broadcasting sites by the wires that Victorians were the first to see crisscrossing their cities and countrysides. The reality turned out to be more astounding, since with the invention of the "wireless" radio communication could occur without physical connections.

Moreover, reality turned out to be less magical, since the new inventions were absorbed without engendering the wider community for which, in utopian novels like Bellamy's, they were a metaphor. Finally, reality turned out to be less grim than the doomsayers feared, at least as of 1994. Whether it's a good thing or a bad, science and technology do not structure our lives as pervasively as writers fifty or a hundred years ago expected them to as we enter the new millennium.

A little over a century after the publication of Bellamy's novel, "wired" is once again a metaphor, in utopian manifestos like the magazine *Wired.* And before too long, it will probably seem as dated as Bellamy's metaphors. In a true information society, connectivity will be transparent, a given, and user emphasis will shift to content and applications.

This won't begin to happen for at least another five years, and won't reach fruition until well into the next century. And when it does, the cultural assumptions propounded by the "wired" prophets will seem as dated as their technological metaphor. So, too, will the worst fears of the critics of the "wired" society, often Europeans concerned that the I-Way will further atomize social relationships.

One reason is that evolutionary stages are not inevitable, universal phases. As both utopians and anti-utopians have learned, they are instead interpenetrated with the past institutions, beliefs, theories, and prejudices of the peculiar societies of which they are a part. Unique national cultures and infrastructure choices will set the pace and tone of both the I-Way and the information society.

This emphatically does not mean that the I-Way and then the information society cannot create radically different modes of communication and interaction between individuals and between information suppliers and clients. It does, however, strongly suggest that the modes of communication and the types and extent of difference will show a wide spectrum of possibilities.

A Pluralistic Universe of Applications

Definitions of the I-Way have proven difficult because of this variety in the forms it can and will take. There are certain givens:

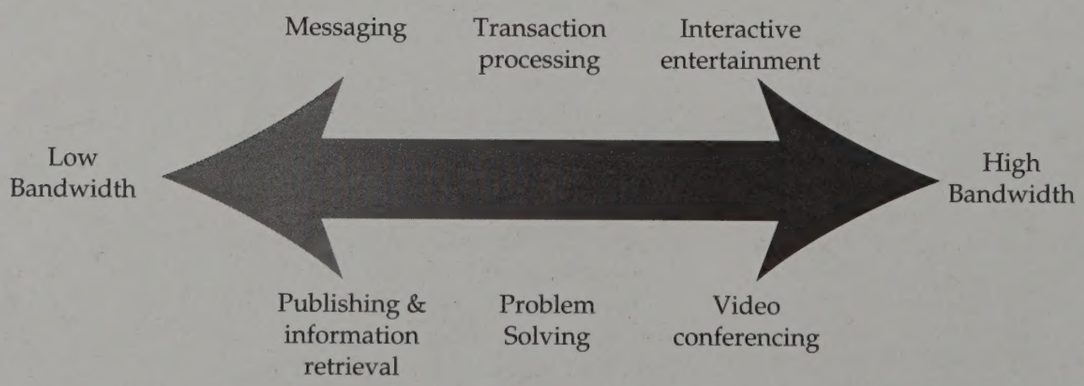
- There must be interconnectivity.
- There must be at least the prospect of sufficient bandwidth to take advantage to some degree of the current digital media convergence.
- There must be opportunities for interactivity.

Beyond these core assumptions, though, the I-Way will be a protean simile, encompassing a wide spectrum of services and applications. The services can be described in terms of a straightforward taxonomy moving up the bandwidth scale:

- Publishing and information retrieval (news, on-line databases, classified ads, listings)
- Messaging (bulletin boards, chat systems, e-mail, fax)
- Transaction processing (home shopping, banking, reservations, etc.)
- Problem solving (simulation, modeling, on-line markets, data analysis, diagnostics, expert systems)
- Interactive entertainment (video on demand, video games, interfaces with audio on demand)
- Video conferencing

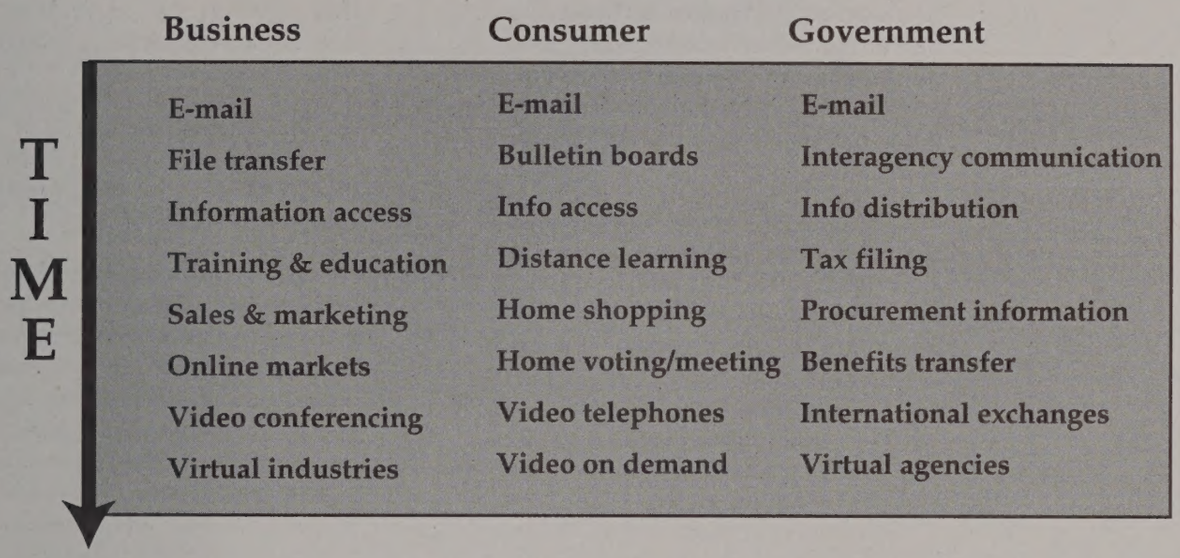
The applications move from simple messaging through transactional activities up eventually to virtual industries and virtual agencies. The latter represent the apotheosis of the I-Way stage, when certain economic functions that are purely informational (e.g., banking and insur-

The Spectrum of New Electronic Services



Source: International Data Corporation, 1994

Key Applications for the Information Highway



Source: International Data Corporation, 1994

ance) can at least theoretically exist completely in Cyberspace.

There are thus two key axes against which to plot the movement of these services and applications: bandwidth and time. A comparison between the transitions shows how, in IDC's view, the two axes are broadly parallel and codependent. A corollary is that relatively low-bandwidth infrastructure is a primary, and currently the dominant, element in the I-Way.

In addition, although considerable overlap exists between the business and consumer applications for the I-Way, significant differences will also shape I-Way development:

- In business usage, low-bandwidth applications are here today. They are message based and transaction driven, and are overwhelmingly PC and LAN centric.
- In business, high-bandwidth applications are almost here now. They will also be PC and LAN centric, and will be LAN based and video driven.
- In consumer usage, low-bandwidth applications have not yet reached the take-off point, but they are very close. They will be message based and access driven, and will be PC centric.
- For consumers, high-bandwidth applications are the one element that is not just around the corner. When they come, they will be entertainment driven and will be the only element to center (at least in part) on non-PC technologies — in this instance, current set-top and cable television products and services.

Because most applications will in the short run inherently require only relatively low bandwidth, much of what will be done in the foreseeable future can be

done with today's technologies and via today's industry's structure. Faster systems, lower transmission costs, better message sending/receiving and browser software, improved security and encryption systems, and improved Internet utilities all can be delivered by today's information and communications industry structure. Only video services to the home will require a more revolutionary approach.

This is highly significant, since if most of the opportunity, and virtually all of the short-term revenue, can be met through evolutionary progression, it will center on activities within the two sectors currently involved in these activities, the PC and telephone industries. The only area where a major shift in players and markets can be envisioned would be high-bandwidth video services.

Competitive Advantage

This gradualistic scenario also means that it is possible to evaluate the prospects for companies and vendors over the next half-decade or so based on their situation and activities today. Current strengths and weaknesses of vendors and of national infrastructures will dictate the new market's winners and losers.

The evolution of the I-Way out of the existing industry favors the existing industry luminaries. In particular, U.S. vendor leadership in today's information technology industry gives it a huge advantage in supplying hardware and software for the I-Way. Moreover, the strong position of U.S. companies in both the IT and entertainment industries should reinforce each other. However, it is probable that services and some content will have a strong local flavor.

The issue of winners and losers can be amplified in terms of Michael Porter's influential *The Competitive Advantage of Nations* (1990). To simplify, Porter has grouped and ranked the key determinants of a nation's economic success in a particular endeavor as, in increasing importance:

- Factor conditions: natural resources, including human resources (education, values, etc.), and core infrastructure; these represent a *sine qua non* — that is, they determine whether a nation can effectively compete in a market at all — but they play only a modest role in whether a nation will succeed in it.
- Related industries: the availability of product or components and of crossover skills (steel and automobiles, a nexus of related industries like Silicon Valley, etc.).
- Demand conditions: strong local markets for the product in which to learn user requirements first hand (the importance of this determinant can be viewed in the ceiling so far imposed on Japanese PC manufacturers' success in the U.S. and European markets — their experience in related consumer and business electronics industries could take them far, particularly in certain niches, but then they lost ground without a strong local PC market for feedback to incorporate into new generations in a timely fashion).
- Domestic rivalry: in Porter's most striking finding, the most important single determinant of national advantage is whether at least two major companies based in that country are competing against each other in the market in question (in this scenario, the emphasis on "national champions" in Europe has not only failed, it has been counterproductive).

The Porter model can serve as a focus of analysis for success in the I-Way as well:

- Factor conditions would include access to capital, worker and consumer skill levels, and the development of the existing infrastructure (PCs per worker and household, CATV penetration, quality of telephone system, etc.).
- The (inter-) related industries would be computers, consumer electronics, publishing, telephone, and entertainment.

- The demand conditions would include consumers, business, government, and educational institutions.
- Domestic rivalry would broaden to encompass start-up activity, openness, and the regulatory climate as well as the competitive environment.

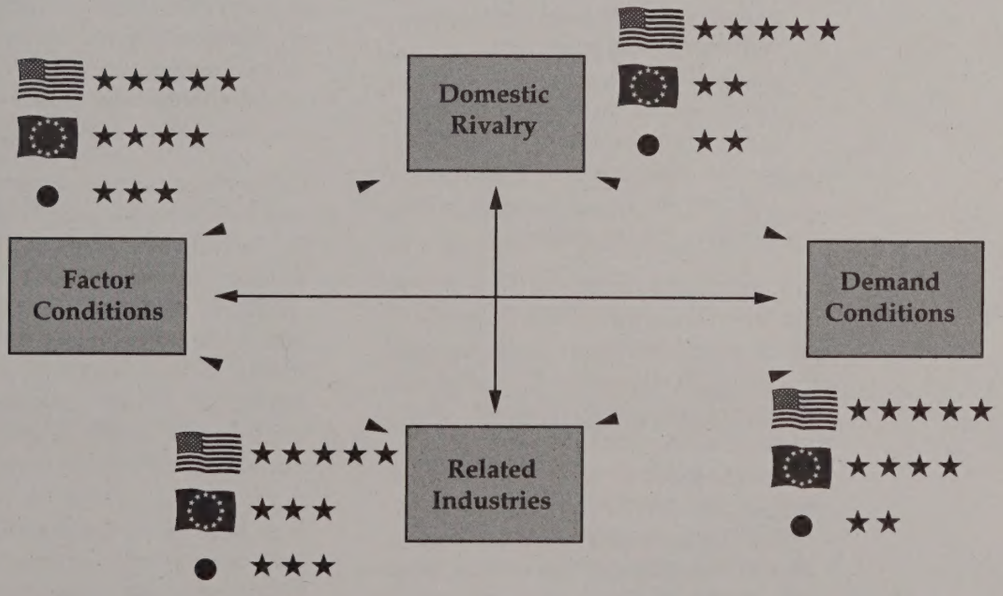
The competitive advantages of nations in the development of the I-Way could then be plotted against the redefined Porter terms.

The Four-Way Scorecard

In our view, the current competitive situation, and thus the most likely scenario for at least the first half decade of the I-Way, tilts strongly toward the United States, followed by Western Europe and then Japan.

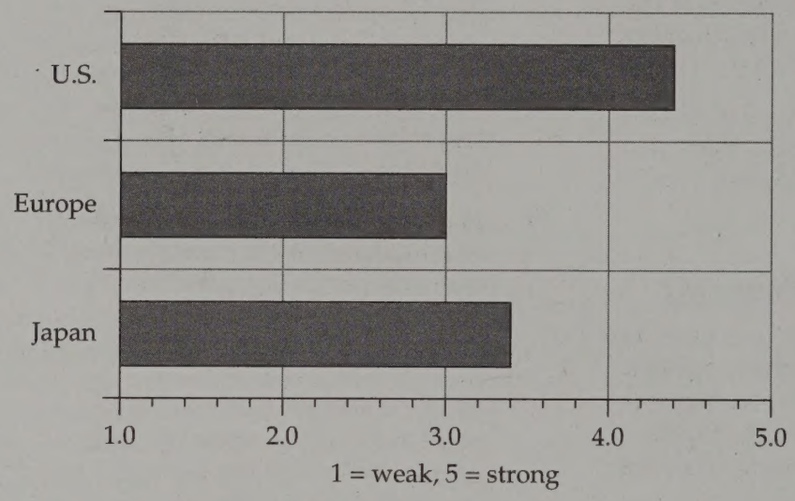
- In factor conditions, the United States has the edge in a number of infrastructure issues, including its high levels of PC usage, the high-quality telephone system, and pervasive CATV systems. Europe has widely varying infrastructures, with much of Northern Europe able to compete effectively in a number of areas, but with most of the continent's southern rim still lagging far behind. Japan has strong human resources, but is lagging in PC-related (LANs, e-mail, etc.) as well as cable infrastructures, and is not as far along in the transition to fiber optics as might be expected.
- In related industries, the U.S. weakness in consumer electronics is more than offset by its strengths in the other relevant areas — computers (including, or even especially, software), publishing, telephone, and entertainment. Europe again displays highly uneven development, not only between the upper and lower halves of the continent but also among the different industries in different countries. Due to language and other issues, Japan is today competitive on a worldwide basis only in consumer electronics, which will not be particularly relevant in the early years of the I-Way,

Current National Competitive Positions on the Information Highway



Source: International Data Corporation, 1994

Regional Strengths in Information Highway-Related Industries: The European Union View



Source: The European Commission's Inter-Service Group

when technology will be driven by the personal computer industry.

- In demand conditions, true potential demand mirrors factor conditions (see below).
- In domestic rivalry, only the United Kingdom rivals the dynamism in the United States, although privatization and an at least verbal commitment to increased local competition are now nearly universal, while the difficulties in removing the impediments to competition are also universally difficult, as indicated by the recent collapse of the U.S. telecom legislation.

It is interesting to compare these scores with other evaluations. The European Commission's Inter-Service Group has rated what it calls the seven multimedia industries (computing; consumer electronics; telecommunications; TV, film, and music; publishing and information; imaging; and services) in Europe, the United States, and Japan. As a rough index, we've averaged the results for all seven industries by the three geographies; the results parallel the IDC view, except that, if anything, the Europeans are more pessimistic about their own industries.

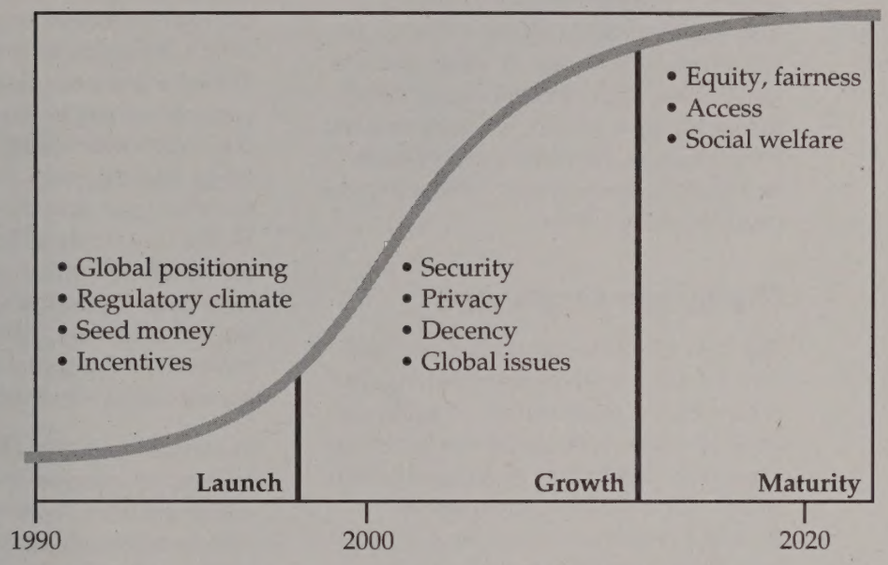
The Role of Government

A complicating factor in this kind of analysis is how to evaluate the government's role, a topic that we would include as part of the domestic rivalry equation when discussing the I-Way. There is no simple answer, since the proper role would change over time. The key is to play the right role at the right time.

In the launch phase, some seed money and incentives are proper, as long as they are broadly available (and thus do not involve the government in having to substitute for the market in determining which technologies will succeed) and limited in time (and thus do not lock the infrastructure into outmoded and/or inadequate choices). Some government initiatives will also be necessary to help in global and/or regional positioning (e.g., helping push international protocols, dealing with copyright issues, negotiating on access to satellite transmissions, etc.).

Volume 29, Number 23

The Evolving Role of Government in Information Highway Activities, 1990–2020



Source: International Data Corporation, 1994

But the most important contribution of the government during the launch phase may be to revamp the regulatory environment so that it is (1) conducive to competition, and (2) applicable to a new era of media convergence. This is proving a tremendous hurdle for a number of countries, for example France and Japan, where different administrative agencies were in essence partners with noncompetitive "national champions" in what were once distinct markets.

In the growth phase, the government must help regulate conditions that would otherwise inhibit expansion of the I-Way, specifically security, without which businesses will be chary of participating (although they also balk at government control of security, as the Clipper chip debate in the United States has demonstrated), and privacy, without which individuals will come to recognize that they are at risk.

The government must also strike a difficult balance on inevitable topics of debate like "public decency" and possible use of the I-Way for illegal activities. On the one hand, privacy concerns and other growth factors suggest that the government should take a broadly laissez-faire position on these questions as media converge in new forms; on the other hand, on "hot" issues like child pornography, and even on cooler topics like violence and adult sex, it is conceivable that in some countries a degree of regulation or, better, industry self-policing supported by government rhetoric may prove useful to protect I-Way growth from worse restraints.

Finally, throughout the growth phase the government must continue to participate in global and regional issues related to the I-Way.

As the I-Way era reaches maturity, the government should address issues of equity and fairness, universal access, and

social welfare. This is not to say that the present concern of some governments with these issues is necessarily premature if it is focused on insuring that no actions are taken that would preclude universal, equitable access when the I-Way is mature. However, there is a real danger that if specific rules are created too early, especially in the launch phase, they may turn out to be a procrustean bed limiting the scope and distorting the promise of the I-Way.

The Single Scorecard

The next step is to weight the four factors, whether by the Porter rankings or other criteria. In this effort, a number of difficult issues arise. In particular, evaluating the contribution of demand conditions to overall I-Way prospects in different countries is not a simple equation. High interest in the subject as revealed in standard sources, especially surveys, will not necessarily translate into strong business, and vice versa.

These considerations suggest that the rankings in the Porter model may need some slight adjustments before they are applied to the I-Way. To start with, factor conditions and demand conditions would be interrelated and roughly equal, with a slight nod probably toward factor conditions.

Then the related industries and domestic rivalry probably should also be linked. The reason is that, with digital media convergence, related industries become, at least potentially, domestic rivals. There would then be two possible rankings, with related industries and domestic rivalry double-weighted against the combination of factor conditions and demand conditions.

It should then be possible to come up with a tentative scorecard on the potential relative market opportunities for the I-Way during its formative half-decade. The data and analysis necessary for this comparison can be drawn from a new IDC multiclient study, *Building a Global Information Highway: National Infrastructure Plans and Activities in the Americas, Europe, and the Asia/Pacific Region, 1994,* for which IDC offices in 16 countries have contributed discussions of the existing infrastructure, political and economic environment, popular attitudes, and planned activities related to the I-Way.

We would welcome client feedback on the tentative scores on the opposite page, which are based both on objective criteria and on subjective analyses by the report's authors. For example, the wide dissemination of the Minitel in France could be taken as a strongly positive sign for the I-Way. However, IDC France notes a potential irony — that the popularity of very low-bandwidth applications on the Minitel creates a likelihood that the full I-Way implementation with a wider range of applications will be delayed.

In any case, all participants in planning for the next exciting stage in the development of the information and communication technologies markets are reminded that these are merely a description of the cards that individual players have been dealt. How intelligently they bet on their hand and how well they play their cards will be the only true determinants of success.

When you're responsible for understanding the intricacies of the global computer industry's maturation and growth IDC's Computer Industry Report is the most reliable source of information and analysis you can find.

THE GRAY SHEET
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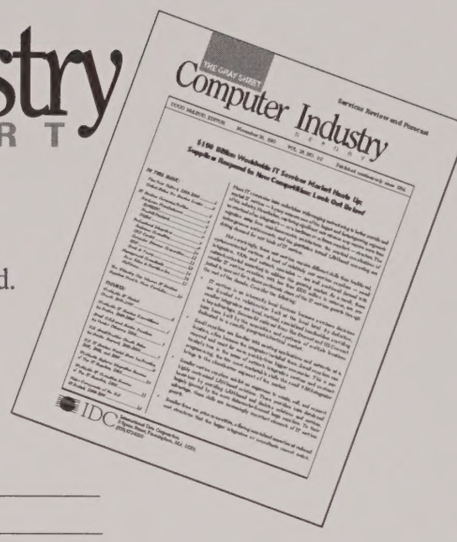

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Relative I-Way Opportunities in 16 Countries

Country	Factor/Demand Conditions	Related/Competitive Industries	Score
The United States	5	10	15
The United Kingdom	4	8	12
Australia	4	6	10
Canada	4	6	10
Denmark	4	6	10
Germany	4	6	10
Sweden	4	6	10
The Netherlands	4	5	9
Finland	3	5	8
France	2.5	5	7.5
Japan	2.5	5	7.5
Singapore	4	3	7
The Republic of Korea	2	4	6
Italy	2	3	5
Mexico	2	2	4
Brazil	2	0	2

0–5 scale, double-weighting for related industries and domestic rivalry

Source: International Data Corporation, 1994

Building a Global Information Highway

The new IDC study, *Building a Global Information Highway: National Infrastructure Plans and Activities in the Americas, Europe, and the Asia/Pacific Region, 1994*, spans 16 countries over 700 pages of text, tables, and figures. After an introduction and an overview of the relevant technologies, the core of the study presents 16 chapters prepared by the IDC office in each of the participating countries, plus a discussion of pan-European events prepared by the European Networks Expertise Center in Amsterdam.

The chapters cover:

- The United States
- Canada
- Mexico
- Brazil
- The Pan-European Perspective
- Germany
- France
- The United Kingdom
- Italy
- The Netherlands
- Denmark
- Sweden
- Finland
- Australia
- Japan
- The Republic of Korea
- Singapore

Each chapter deals with the following:

- Key demographics
- The nature and extent of the information infrastructure (PCs, TVs, VCRs, CATV, satellite, fiber optics)
- The relevant government activities (active ministries, regulatory framework, degree of centralized direction, etc.) and legal issues (copyright, privacy, etc.)
- Business players, alliances, and plans (including ownership and concentration issues, M&A and consortium activities, and participation in testbeds)
- Consumer attitudes (both businesses and households)

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THE GRAY SHEET
Computer Industry REPORT

Published continuously since 1964.

Sybase to Gobble Up Powersoft: What's Behind the Billion-Dollar Deal?

In a surprise announcement officially released at 7:30 a.m., EST, on November 14, 1994, Sybase revealed its plans to acquire Powersoft in an exchange-of-stock deal. With a cash equivalent valuation of approximately $945 million (call it $1 billion, rounded) on the announcement date, the acquisition shows that Sybase dearly wants to acquire Powersoft. The *Wall Street Journal* calls it "the second-largest acquisition in software history." With the widespread installation of SQL Server from Sybase and PowerBuilder from Powersoft, this deal has many implications for IS customers.

November 18, 1994 Vol. 29, No. 24

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The Warning Signals

Sybase positions its acquisition of Powersoft as the stepping stone to becoming the number-one client/server product supplier, but we believe that today this positioning is born more of a "marketecture" than of a solid and cohesive product foundation. In reality, we believe that Sybase must meet a number of competitive challenges before it can ever hope to ascend to such a lofty position. In reaching that conclusion, we cannot ignore warning signals such as the following:

- **Modest stock premium.** The very modest premium offered to Powersoft stockholders
- **Build Momentum about-face.** The apparent about-face by Sybase on Build Momentum
- **Powersoft sales.** The flattening of Powersoft sales in its third fiscal quarter ending September 30
- **Enterprise Momentum delay.** The longtime delay (if not gutting) of Sybase's Enterprise Momentum initiative

These factors may be telling us there is more to this story than meets the casual eye. Many of these challenges that Sybase now faces are an integral part of IDC research on the evolving client/server marketplace.

The Gray Sheet

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United We Stand

In a well-orchestrated public relations blitz, Sybase and Powersoft officials conducted a kickoff three-city press conference on the afternoon of November 14, followed by individual telephone sessions to respond to analysts' questions. *The Gray Sheet* presents here the acquisition story told by the Sybase and Powersoft officials.

Bringing Together the Leading Client with the Leading Server

Sybase sees itself as inventing client/server on the server side. Accordingly, the acquisition joins the two leading client/server providers, Powersoft on the client side and Sybase on the middleware and server side. Of course, the objective is for the combined companies to become the number-one client/server product supplier.

Joining the Enterprise Competitors

Casting itself in this light, Sybase views the acquisition as an essential step to give its customers a source of one-stop shopping for client/server. Now the company feels that it is fully primed to compete in the top tier with the likes of Oracle, Microsoft, and IBM.

Complementary and Synergistic

Joining the two parties in the acquisition is viewed as both complementary and synergistic in several ways:

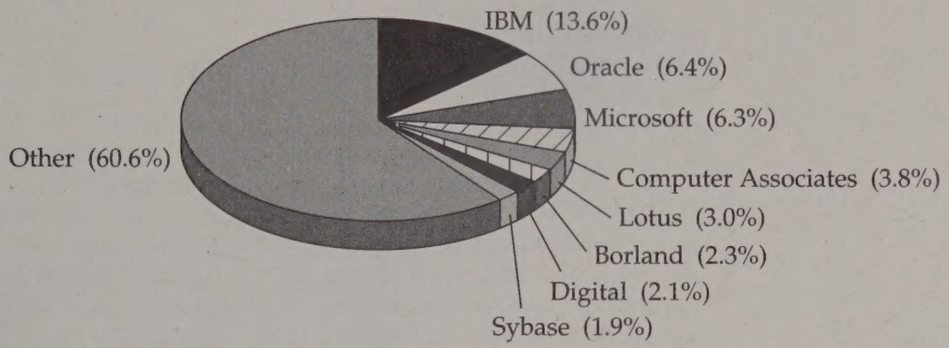
- **Customer overlap.** Approximately 30% of Sybase customers now use PowerBuilder. That percentage is seen as growing to 50% to 60% over time, with the remaining customers relying on tools from competitive vendors. Of course, Powersoft owes its very existence to the fact that Sybase never provided adequate client/server tools for SQL Server customers. Consequently, Powersoft prospered by moving in to fill this vacuum.

- **Sales and distribution.** Sybase's product distribution strategy is built around a direct sales force to IS organizations, and Powersoft's strategy is built around indirect sales to low-end systems integrators and value-added resellers. The acquisition opens up the perfect opportunity for Powersoft products to be sold through the Sybase direct sales force and vice versa.

- **Database engines.** Watcom SQL is designed as a shrink-wrapped low-end product that is easy to install and maintain. This profile contrasts to Sybase's SQL Server, which targets a higher-end marketplace that requires considerable DBA skills to install and maintain.

- **Product development organizations.** Powersoft brings developers skilled at building tools and compilers (Watcom) to the acquisition. Both of these skill sets are badly needed by Sybase. Leveraging the Watcom C compiler technology in the diverse tools from both vendors certainly will be a key element in the future to enable the building of scalable tools. On the other hand, Sybase developers are skilled at building server engines — unexplored territory for Powersoft.

Vendor Share of Worldwide Application-Development Tool Revenue, 1993



Total = $19.6B

The worldwide application-development tool market totaled 19.6 billion in 1993, led by IBM, Oracle, and Microsoft. Over 120 U.S.-based ISVs had 1993 application-development tool revenue of greater than $5 million. Powersoft's 1993 revenue from application-development tools of $42 million ranked it 22nd among major U.S.-based ISVs.

IDC expects revenues in the worldwide application-development tool market to increase 13.3% from 19.6 billion in 1993 to 22.2 billion in 1994. They will earn a 1993–1998 CAGR of 14.9% and reach 39.1 billion by 1998.

During the next several years IDC expects to see a significant increase in demand for tools that are adept at supporting the distributed computing paradigm. Therefore, tools such as relational database (RDBMS) engines and client/server development will continue to grow popularity and sophistication as organizations seek to leverage the increasing power of next-generation client/server development tools.

Source: International Data Corporation, 1994

- **Openness.** Both vendors have tried to position their products as open, Sybase with its Open Client/Server Architecture and Powersoft with its CODE (Cooperative Development Environment).
- **Competition.** Both companies fiercely compete with Microsoft and Oracle.
- **Tools.** To succeed in the enterprise marketplace, tools from both companies are in need of support from Sybase's announced Enterprise Momentum Architecture and its embedded repository.
- **Professional services.** Sybase can leverage its professional services organization to serve PowerBuilder customers by delivering the client/server application development services.

The Growing Tool Portfolio

Sybase has a long history of tactically acquiring tool technology from third parties, some at considerable expense. The result is that Sybase now markets different families of tools with very little in common. For example, when the acquisition is completed, application development tools sold by the company will include the following:

- **APT Workbench** for building character-based centralized applications

- **DEFT** for business analysis and modeling
- **Gain Momentum** for multimedia Unix applications
- **Build Momentum** as a visual development tool for building two-tier client/server applications (the product is said now to be in controlled release)
- **Enterprise Momentum** as the overall architecture and repository that was originally envisioned to integrate all of the diverse tools (from the unofficial rumors that we hear, large portions of this product initiative have been scrapped)
- **PowerBuilder** as a visual development tool for building Windows client and data-access applications
- **Watcom VX-REXX** as a visual development tool for building OS/2 client applications

PowerBuilder is to remain database independent.

Diversity of Industry Reactions

Picking up on the media blitz staged by Sybase and Powersoft, one group of analysts is applauding the acquisition and predicting that an unqualified success will result from combining the market presence of Sybase and Powersoft. But we wonder if these analysts have thoroughly thought through what is going on here. Certainly, an event of the magnitude of the proposed acquisition deserves very close scrutiny. Therefore, we believe it is essential to factor in a number of more subtle considerations in order to arrive at a balanced assessment.

The Devil's Advocate

Soon after the proposed acquisition was announced on November 14, the pace of phone activity picked up. Clearly, we were experiencing an immediate acknowledgement that many parties in the information systems community were interested in a thorough analysis. And, in fact, it is essential, because the acquisition's driving force is the attempt by both parties to get a better lock on customer mindshare for building client/server applications.

The Deal

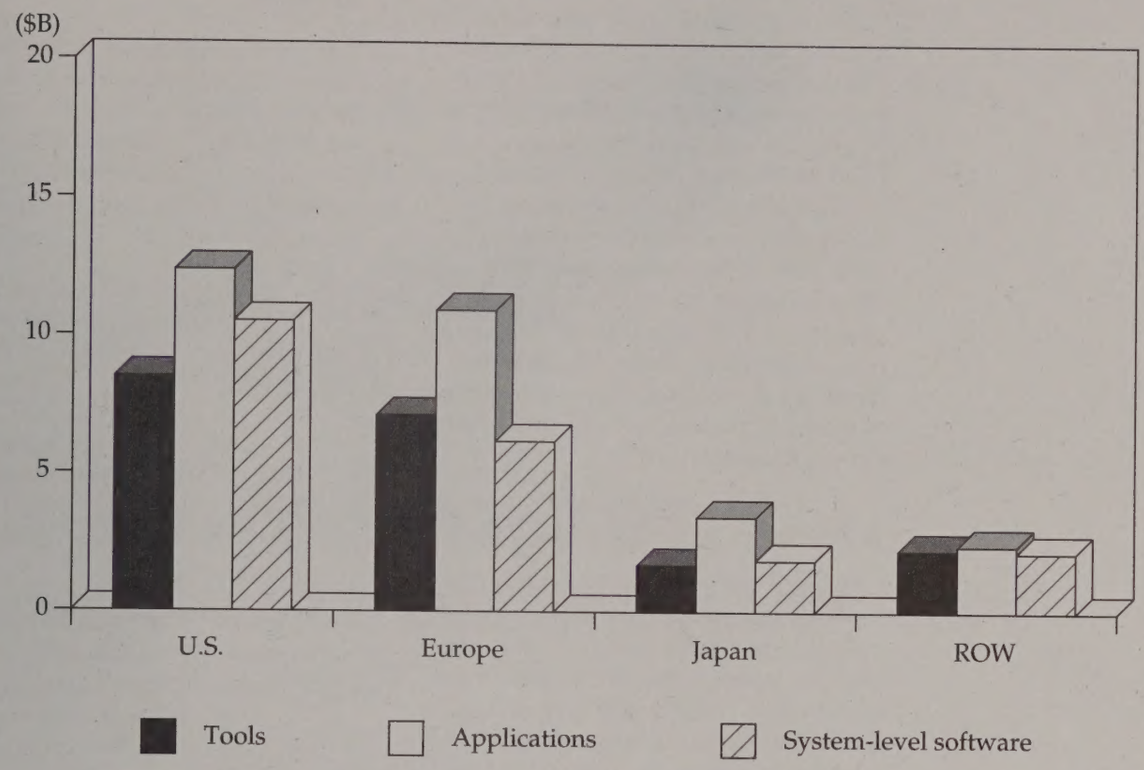
To acquire Powersoft, Sybase is offering 1.6 shares of Sybase stock (trading around $48.5 per share on the Friday prior to the announcement) for each share of Powersoft stock. With approximately 12.2 million Powersoft shares outstanding (as of September 30, 1994), the deal is valued at approximately $945 million (12.2 million shares times the ratio of 1.6 times $48.5 per share) for Powersoft stockholders. If anything is certain, it is that some Powersoft stockholders will be very wealthy once this deal is consummated. If the original Powersoft founders ever break off to found a new company, surely the venture capital money will come knocking at the door.

Even though Powersoft's growth has been nothing short of spectacular, its software license fees for the nine trailing months ending September 30, 1994, amounted to a modest $73.5 million. Net income for the same nine-month period was an even more modest $9.5 million. Certainly, with a modest 1% to 2% return on its investment based on current earnings, Sybase would have been better off putting its money in a low-yielding money-market fund. Therefore, Sybase must be betting on a continued rapid ramp-up in Powersoft product sales to justify the investment. In fact, Sybase officials are counting on being able to ramp up the sales of Powersoft products to about $200 million in fiscal 1995.

A Rich Multiple Is Offered to Buy Powersoft

Clearly, Sybase is tendering a very rich multiple to acquire Powersoft. Our calculations indicate that the Sybase offer to buy Powersoft is at approximately nine times trailing revenues. This huge ratio tops the rich multiple that Microsoft recently paid to buy Intuit. And the mag-

Distribution of Packaged Software Consumption by Region and Major Sector, 1993



Source: International Data Corporation, 1994

nitude of the Powersoft multiple seems even richer in light of the considerable overlap that we see between Powersoft's application development tools along with its Watcom database engine and Sybase's SQL Server and three separate product families of application development tools. Naturally, Sybase disagrees with this assessment. With the two companies together, the blended result will truly emerge with a portfolio product strategy.

Sybase's Bleak Record as a Tool Builder

Sybase's record as a tool builder played no small part in the billion-dollar acquisition. Any objective assessment of the record of Sybase as a tool builder would certainly give Sybase a low grade. Confidential sources have told us that Sybase had been talking to more than one client/server tool vendor about a possible acquisition since the summer of 1994. In our opinion, some of these vendors with which discussions are said to have been held offer a toolset whose architecture is more scalable than that of today's PowerBuilder. However, none of these vendors can come close to matching the market success of PowerBuilder. An article appearing in the November 15 issue of the *Wall Street Journal* states, "Mark Hoffman, Sybase's chairman and chief executive officer, said he approached Powersoft's CEO, Mitchell Kertzman, in July for talks." This tells us that Sybase has felt a long-standing need to once again shore up its application development tools through acquisition.

Today, there are very few tangible results to be seen from Sybase's System 10 tool vision that was first previewed to analysts several years ago. The main components of the vision were to be Gain Momentum, Build Momentum, and Enterprise Momentum. Gain Momentum was

acquired as a generally available product. Build Momentum was first slated as Sybase's killer weapon against PowerBuilder and is now said to be in controlled release. One year ago Sybase was saying that the company felt it could sell Build Momentum into 60% of its installed SQL Server customer base. The robustness of Build Momentum certainly seems to be an open question in light of Sybase's acquisition negotiations since the summer of 1994. And the Enterprise Momentum effort is rumored to have been gutted in favor of the 1995 release of several components that will be salvaged from that effort. We do not expect the release of any of those component products much before the end of calendar 1995.

A Portfolio Tool Strategy

As a tactical acquirer of tool technology that is originally built in a variety of places, Sybase is left with a portfolio of discrete products that do not work with one another. Accordingly, the company has followed a marketing strategy of growing its tool business by acquiring technology developed elsewhere and selling that diverse technology into its existing customer base. Company officials state that this result is just fine since each tool family is targeted at a different application niche. Therefore, there is no need to complicate things by building in integration and interoperability between tools — Sybase customers just don't want to deal with that complexity. And for low-end applications, this niching may be relatively satisfactory.

However, for a tool vendor that wishes to be taken seriously on the enterprise level, the lack of architecture and consistency between tools seems far less than satisfactory. This shortcoming is clearly in contradiction to the philosophy that stands behind three-tier client/server and clearly in conflict with the IS organization's ability to share computing resources throughout the enterprise. We fear that over the long term, the stovepipes contained within a vendor's portfolio strategy may work to the detriment of the IS customers' best interests.

Powersoft — Was Management Concerned About a Long Winter?

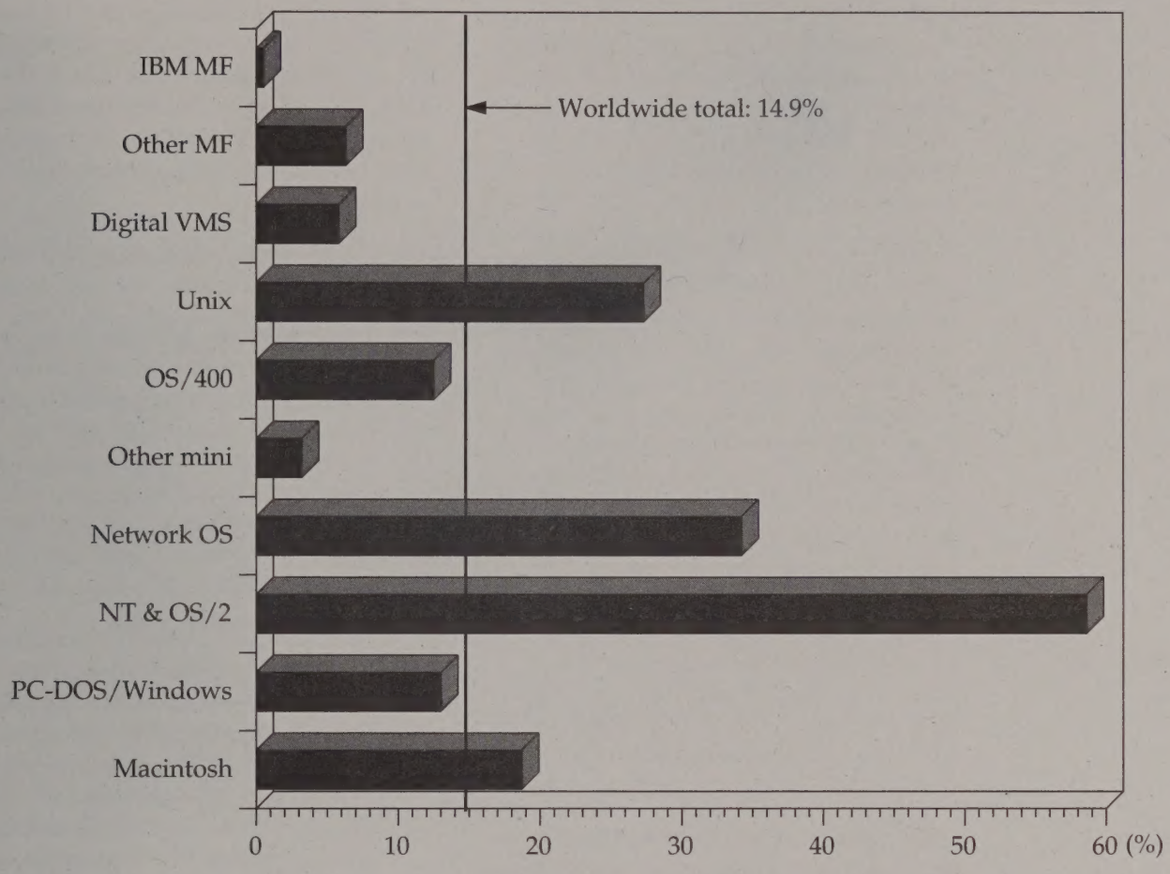
Powersoft's critical need to scale up the PowerBuilder architecture was a key reason that such a successful company was willing to be acquired. The billion-dollar offer is nice at Thanksgiving time, but that valuation should be put into perspective:

- **Modest premium to stockholders.** In reality, the acquisition price adds only about 10% to 15% to the price of Powersoft stock. If Powersoft officials felt that they had the marketplace beat hands down, they would hold on and watch the valuation of Powersoft stock grow well beyond that 10% to 15% acquisition price premium.
- **Extensive work needed to build server technology.** Does Powersoft now realize that the extensive server development work required to make PowerBuilder truly capable of building large-scale applications is a bit more than Powersoft would be able to tackle on its own?

Does the unexpected willingness of Powersoft management (and the board of directors) to accept this rather modest 10% to 15% premium tell us that the company was running into stone walls that might limit its success in the near future?

Throughout most of its short history as a tool provider, Powersoft has had an enviable record of growth. Yet it is quite interesting to look at Powersoft's growth in product license revenues for its last two fiscal quarters. For the quarter ending September 30, 1994, product license revenues grew only 3% over the prior quarter ending June 30, 1994. Powersoft company officials attribute this low growth to the summer months that are traditionally slow. If the Powersoft acquisition closes before December 31, 1994, the public may never know the degree to which PowerBuilder sales changed in the current fiscal quarter. Consider the following quote from a recent IDC analysis:

Worldwide Application-Development Tool Growth by Operating Environment, 1994–1998



Source: International Data Corporation, 1994

"Our best guess is that in today's market Powersoft continues to have great success at the low end, led by PowerBuilder Desktop. Volume continues to build nicely here. On the other hand, we suspect that at the high end with PowerBuilder Enterprise, sales are slowing down, and the product is meeting greater competition, along with more customer resistance, in the marketplace."

We cannot help but wonder if the Sybase acquisition of Powersoft then is not a clear confirmation of this best guess. At the very least, Sybase has clearly stated that one of the synergies of the acquisition will be the leveraging of the Sybase direct sales force to sell PowerBuilder into IS.

Assuredly, Powersoft sees Sybase's direct sales force as a key element in increasing the sales of its high-end PowerBuilder Enterprise product line. But a hint of something more ominous may be contained in a statement by a Sybase vice president who stated in a conversation after the announcement that "we don't know if they [Powersoft] would have survived alone." Could this statement confirm that Powersoft management agreed to acquisition when the company (as a standalone entity) had reached its peak? Or is such a thought beyond reason?

A Surprise to Most — Even to Those at Sybase and Powersoft

In conversations with Sybase and Powersoft officials (including senior product management personnel) on the days following the announcement, it was revealed by several that they were as surprised by the acquisition announcement as were we outsiders. Apparently, they

did not learn of the acquisition until Monday (November 14) morning. Furthermore, when talking about the overlap between Build Momentum and PowerBuilder, company officials were able to say only that it would take several months for engineers to assess the situation and determine the future of Build Momentum. None of that work had been done to date.

Any acquisition of publicly traded companies requires that the news be tightly controlled. Otherwise, Wall Street traders would be given the opportunity to trade on insider information. However, the secrecy involved here appears to have gone well beyond this requirement. The senior product management personnel we talked to included those directly responsible for both companies' application-development tools. We were left with the decided impression that there had been no discussion with those who know the products on the topic of how well the products from both companies might come together in the case of a possible acquisition or whether, in fact, an acquisition would be a good idea.

Observations such as the above lead us to conclude that the acquisition decision was driven by tactical market considerations such as the mutually perceived need for each company to shore up its competitive position in the client/server application-development tool marketplace.

The PowerBuilder/Build Momentum Matchup

During the last year, Sybase has been quite busy billing Build Momentum as its PowerBuilder killer. In the past, Sybase touted the technical superiority of Build Momentum for several reasons:

- **Object orientation.** First, Build Momentum was reputed to be truly object oriented.
- **Multitasking client.** Second, it was said to be built on a multitasking client operating environment that would deliver exceptional performance on the client side.

With these touted advantages, Sybase planned to enter the marketplace and slay PowerBuilder as the technically inferior product. This strategy should come as no surprise. It is the same one that Sybase so successfully followed in the mid-1980s when the company entered the database marketplace and prospered against well-entrenched competitors such as Oracle.

There is another interesting contrast here between the two tools:

- **PowerBuilder.** In future product development, Powersoft is on a stated direction to integrate native support for C-level coding within PowerBuilder. It would achieve this integration by exploiting the Watcom C compiler technology. Developers would then use the integrated C coding editors to specify the more complex program logic.
- **Build Momentum.** Contrast this direction to the following quotation from the Winter 1994 issue of *Sybase* magazine (published quarterly by Sybase Inc.). We refer to an article on page 7 in which Bob Epstein (a company cofounder who was then in charge of Sybase's Tool Technology Group) talks about Sybase's new tool strategy. Here, Epstein is asked, "What are your competitors in the tools area?" Mr. Epstein responds, "Our competition is not any product that's currently in the marketplace. Our competition is really the idea that tools do not provide what companies need, so they program in C and C++ against native libraries. The majority of the tools marketplace represents a missed opportunity, because nobody has provided anything powerful enough."

The Build Momentum Skeleton

With its growing installed base and near $1 billion purchase price, it is clear that PowerBuilder's future is on firm footing. But what about its look-alike, Build Momentum? The overlap between the two products raises some interesting questions:

- **Superior technology.** Does Build Momentum truly incorporate technology superior to that of PowerBuilder or was Sybase just overdoing the market hype during the last year? For example, does Build Momentum deliver a better object-oriented architecture than PowerBuilder?
- **PowerBuilder barrier.** Will Sybase's tactical strategy of acquiring PowerBuilder's installed base now act as a barrier to introducing the superior Build Momentum technology?
- **Kill Build Momentum.** Will Sybase now kill Build Momentum? If so, will its demise open up an opportunity for competitive tool vendors as the marketplace evolves to serve the vastly different requirements of building big client/server applications?

It seems highly unlikely that Sybase can now publicly continue its portfolio strategy and rationalize the existence of the two similar products, Build Momentum and PowerBuilder. Of course, one possible way to rationalize this dual existence might be to position Build Momentum as the company's object-oriented toolkit. But that stance would then be positioning PowerBuilder as not object oriented (an unacceptable outcome). The only alternative then if Sybase wanted to salvage any of the technically superior features that the company previously touted in Build Momentum would be to reengineer these features into PowerBuilder. We suspect that this reengineering would be a long and arduous process.

The Build Momentum Legacy

For the inquisitive, it is just too tempting to speculate on why Sybase now may have no choice but to kill Build Momentum after spending the last year hyping the product's superiority over PowerBuilder. In order to do some level setting, consider that prior to the announced acquisition, Sybase could have no fears of stepping up to the challenge with Build Momentum and taking on Powersoft and PowerBuilder. Just think back to Sybase's formative years in the mid-1980s when the company was barely a startup firm.

Then, Sybase successfully plied the same strategy with its first product (SQL Server) in the database marketplace. Many of the reasons stated for buying Powersoft make little sense in light of the company's tradition and operating history.

We wonder, are there more deep-seated problems with Build Momentum itself? For example:

- **Architecture.** Is the highly proprietary architecture a problem?
- **Performance**. Is the performance of the interpretative code acceptable for large-scale applications?
- **Scalability.** Could the need to reengineer the two-tier architecture for large-scale application development be an embarrassment?

Beneath the covers, are there fundamental design problems with the Build Momentum architecture that Sybase now realizes would make the tool unacceptable for the big client/server marketplace?

Winners and Losers

As with most media blitzes, words from the public relations group paint the landscape as rosy and full of winners. In reality, a more balanced assessment is generally in order. For example, with the Powersoft acquisition, consider the stakeholders in the discussion that follows.

Powersoft Stockholders — Possibly Thanksgiving in Disguise

Congratulations are in order to Mitchell Kertzman and the Powersoft board of directors, for they are seeking to serve stockholders by maximizing the value that they receive for their investment. In fact, over the next several years, this acquisition could be one of the most significant single fundings of new ventures in history. As today's Powersoft investors and holders sell their newly acquired blocks of Sybase stock, we would not be surprised if a lot of that capital were invested in new ventures.

Sybase Stockholders — Gambling on an Early Spring

Sybase's record as a toolbuilder is dismal, so expect Powersoft to become the tool builder of choice for Sybase. But will PowerBuilder tool sales quickly double to the minimal level that is needed in order to financially justify the acquisition costs? If not, we believe that at least over the short term the lofty acquisition price will lead to a dilution of Sybase common stock earnings.

Will new factors such as that part of the community that no longer views PowerBuilder as database independent slow down the rate of sales growth? If PowerBuilder loses its vestige of openness and database independence, will the indirect VAR (valued-added reseller) and ISV (independent software vendor) channels that have accounted for so much of Powersoft's success now look elsewhere? Will the fact that Sybase is selling professional services into the PowerBuilder customer base weaken the established relationships with Powersoft's indirect product distribution channels? In other words, will Sybase now be perceived as competing with the indirect VAR and ISV channels that it is trying to sell into?

Powersoft Customers — For Some a Joyful Christmas

For the typical Powersoft customer who builds client applications to access only SQL Server database servers, the acquisition will provide Powersoft with the critical mass and deep pockets needed to reengineer PowerBuilder to an architecture that is more suitable for building big client/server applications. So for the one-stop shopper, the acquisition is good news. It should improve the odds of providing Powersoft scalability in the future.

For the remaining Powersoft customers who need to keep open the option of using PowerBuilder to access heterogeneous database servers, it is far less clear how successful PowerBuilder will now be as a database-independent development tool. The first challenge will be to Sybase's commitment to database independence. Powersoft has already declared that commitment, yet we cannot help but wonder if the first tool development priority will not always be to Sybase's SQL Server engine. After all, blood is thicker than water. Sybase's best interests dictate that it move into the position of an IS organization's sole supplier whenever possible.

Consequently, while support for competing database engines will always be present through open APIs, the temptation may also be to engineer PowerBuilder to work best with Sybase's own SQL Server.

The second challenge will be in getting competitive database vendors interested in cooperating with Powersoft as the tool-building group for their archrival. From our informal conversations with two of the primary competitors, the relations will be strained. Does it now seem realistic that Oracle would involve Powersoft in its third-party early-release programs? Does it seem reasonable that a Sybase salesperson involved in a combined database/tool sale would be neutral toward a customer's evaluation of whether to buy the Informix or Sybase database?

Anyone who understands the industry realizes that database vendors are among the most competitive in the industry. Today, these competitors do not feel that Sybase plays fair with them in opening up SQL Server to use by the competitors' tools. We believe that over time the results will be obvious. The competitive atmosphere will surely dictate an increasingly strained relationship between the Sybase initiative that is responsible for the care and feeding of PowerBuilder and the competitive initiatives that are responsible for the care and feeding of their database engines. To expect anything different would not be dealing with reality. After all, it is the database vendors themselves who foster this fierce competition.

Sybase Customers — Just Show Me

Sybase is in desperate need of a development organization with a proven track record of building tools. But how long will it take for the acquired Powersoft development organization to step up to the enterprise challenge and to reengi-

neer PowerBuilder so that it is suitable for building large-scale client/server applications? If Build Momentum is built on a better technology architecture than PowerBuilder, will Sybase customers be the losers?

Once the acquisition is finalized, Sybase's ascent to the ranks of an enterprise client/server tool vendor is by no means assured.

Competitive Challenges That Only Sybase, and Not Another Tactical Acquisition, Can Solve

In order to recover from the failure of its internal efforts to develop tools over the last three years, Sybase looked at a variety of acquisition options during the last six months. Although the price tag was horrendous, the decision to buy Powersoft may well have been the best alternative because Sybase wanted immediately to leverage the customer presence that Powersoft has built. However, PowerBuilder, even with its upcoming release of 4.0, is still a little client/server tool whose scalability continues to be limited to the building of workgroup and departmental applications. Along with future efforts to reengineer the PowerBuilder flagship product to be more suitable for building and efficiently maintaining large-scale applications, Sybase will face a series of internal and external challenges.

From an Acquirer to a Builder of Tool Technology

It is quite clear that Sybase has been less than successful as a tool vendor building its own tools. As a result, the company over time has relied on a portfolio strategy of tactically acquiring the latest type of hot tool and then trying to sell the latest craze to Sybase's current customer base. To date, the company has shown little measurable success implementing strategy whereby it is committed to the evolution of one core tool architecture.

In this respect, the Powersoft acquisition is little more than a continuation of this past. If Sybase hopes to build future credibility as a viable tool vendor that customers can rely on to build enterprise applications, it is imperative that the company mature beyond its reoccurring pattern of merely trying to put a marketing face on tool technology that has been acquired from a third-party development organization. In other words, it is imperative if the acquisition is completed that Sybase invest heavily in the PowerBuilder architecture to reengineer it beyond its current little client/server profile. In addition, there is the obvious need to reengineer the other tools in the portfolio so that they deliver more coherency and consistency beyond their current niche targets.

Yet, one cannot help but wonder if there are cultural, mindset, or vision barriers present in the Sybase organization that have limited the success of previous tool technology acquisitions. If so, could these conditions step in and halt the future success of the PowerBuilder acquisition? Will the Powersoft founders who have been responsible for PowerBuilder's success, and are now multimillionaires, choose to stay around once their current employment contracts expire? Or will they follow the true entrepreneurial spirit and move on to their next endeavor?

First Compete with the Database Vendors

Reengineering will be a considerable challenge because Sybase's most direct competitors today, database engine vendors such as Oracle and Informix, have demonstrated a much more solid history of designing a core tool architecture and then consistently evolving that architecture to deliver new technology.

Once the acquisition is completed, a good percentage of IS customers will surely move to view the acquired Powersoft tools as database (SQL Server) dependent and not suitable for building database- (and technology-) independent applications. And this will be a problem for Sybase no matter what sort of a marketing spin the company puts on the acquisition. Of course, Sybase can relax to the degree that

this same problem is one that must also be dealt with by Sybase's primary database competitors, Oracle and Informix.

Then Meet the Looming Scalability Challenge

Whatever the outcome of competing with its database vendor peers, we believe that the combined Sybase and Powersoft portfolio of tools in its current state is limited in any of the tools' abilities to deliver full two-way scalable client/server application development. Furthermore, in our judgment, the PowerBuilder architecture will have to be significantly reengineered to support the building of large-scale applications. On one hand, the acquisition makes sense because the organizations can now combine their resources in the quest to build more scalable toolsets. Yet, customers' rapidly evolving need for scalability will mean that the portfolio of Sybase tools is open to direct frontal attack by a host of third-party application-development tool vendors who are rapidly building scalable toolsets. To the advantage of the third-party vendors, their tools are often truly database independent because these third-party vendors are not also database engine vendors.

Now the Pieces Are in Place to Compete at the Enterprise Level

As for stepping up to the competition at the enterprise level (with vendors such as IBM and Microsoft), Sybase can best deal with enterprise competitors after addressing the previous challenges. Microsoft certainly would enjoy this whole-hearted endorsement of itself as a prime competitor at the enterprise level. Previously, Sybase has tended to position Microsoft as a vendor that does not understand the enterprise.

Keep the Champagne Bottles Corked

Finally, Sybase officials are now commonly heard stating that the Powersoft acquisition will mark a new year in which Sybase will be recast from "the last to the first" in the client/server application-development tool business. In the number of disconnected tools offered, the joined companies would be right at the top with the leaders. On a more somber note, we suggest that there are a number of reasons why company officials should keep the bottles of champagne corked.